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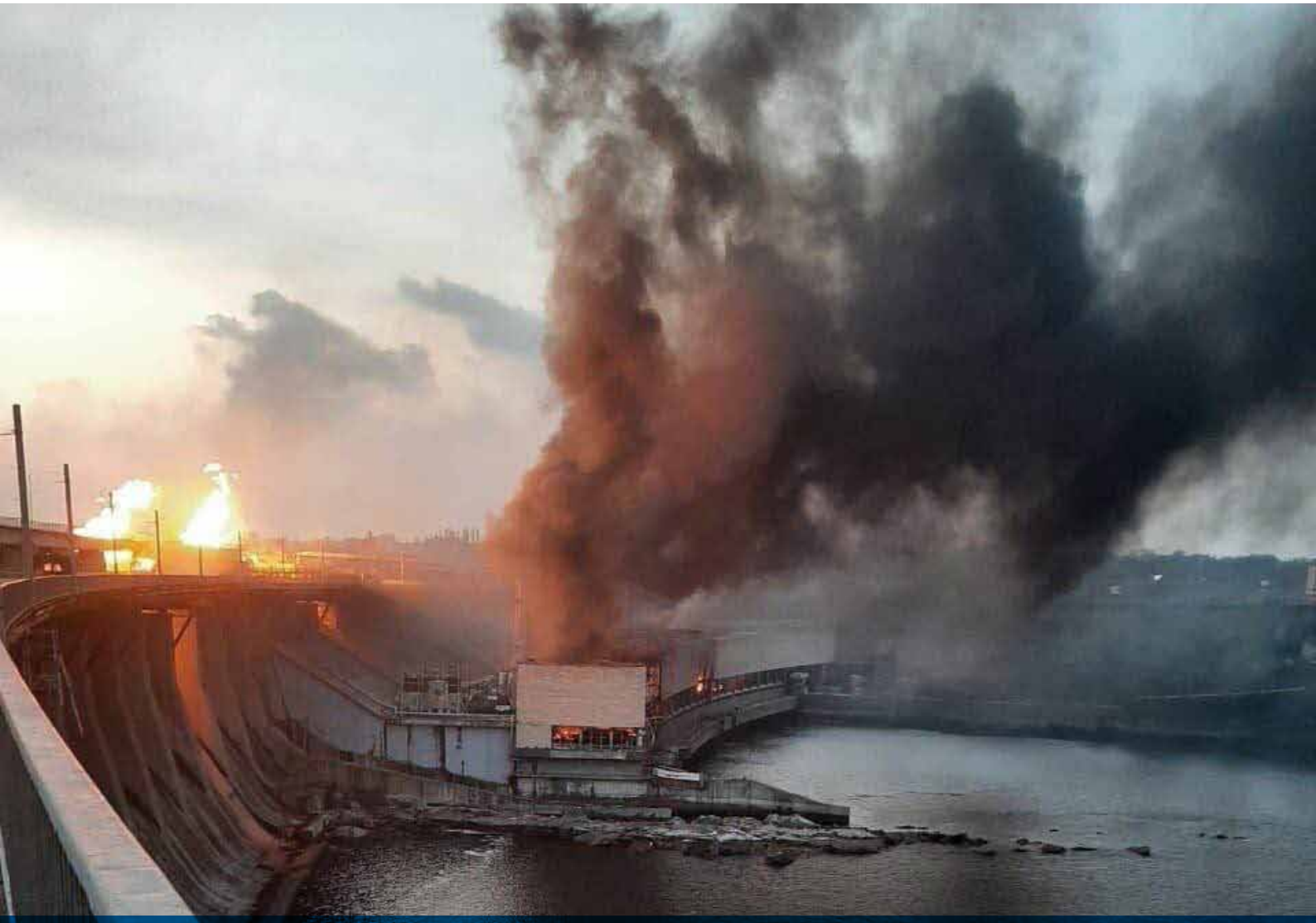

Prospects of Dnipro River Ecosystem Recovery and Degradation

in the Light of War-induced Destruction, Reconstruction Policies and International Financing of Hydropower during the War

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Summary

This report examines the future of the Dnipro River ecosystem and its hydropower cascade amidst extensive war-induced destruction. Historically transformed by six major reservoirs, the Dnipro basin balances energy generation, agricultural irrigation, and biodiversity. Following repeated military strikes on facilities including the Dnipro, Kyiv, Kaniv, and Kremenchuk Hydroelectric Power Plants (HPPs), alongside the catastrophic destruction of the Kakhovka HPP in 2023, the region faces critical decisions regarding post-war reconstruction and sustainable basin-wide management.

The destruction of the Kakhovka dam caused severe immediate environmental and economic damage, but it also initiated the rapid ecological restoration of the historical Velykyi Luh (Great Meadow) floodplain, which in 1956 was inundated by the giant reservoir. Up to 2,000 square kilometers of the former reservoir bed are actively transitioning into natural floodplain with meadows and willow-poplar forest, offering significant biodiversity and climate adaptation benefits. Despite this ecological shift, the report details that Ukrainian government policies and the state-owned operator Ukrhydroenergo (UHE) remain committed to rebuilding the Kakhovka dam.

In reviewing domestic policies, the report outlines a dual approach by the Ukrainian government: simultaneously funding alternative water pipelines to adapt southern regions to the absence of the reservoir, while adopting resolutions to expedite the design of a new Kakhovka HPP. Martial law exemptions are currently being used to bypass mandatory Environmental Impact Assessments (EIAs) for these initiatives. The authors identify systemic risks associated with pursuing these large-scale hydropower ambitions. These include high construction costs, the inherent vulnerability of mega-dams to military strikes, corruption risks within state procurement, and the perpetuation of outdated irrigation models that contribute to secondary soil salinization.

A thorough analysis of the international financing landscape reveals that institutions such as the World Bank, European Bank for Reconstruction and Development (EBRD), and European Investment Bank (EIB) have allocated close to $1 billion to Ukraine's hydropower sector since 2023. Currently, these funds are strictly directed toward emergency repairs, equipment replacement, and grid resilience at existing dams, with no explicit commitments to rebuild Kakhovka. However, the report raises concerns that International Financial Institutions (IFIs) are deferring crucial environmental and social audits until the post-war period. This "compliance gap" limits public participation, transparency, and proper evaluation of alternatives.

Ultimately, the report concludes that upcoming financing decisions will determine the ecological and economic trajectory of the entire Dnipro basin. Stakeholders face a fundamentally mutually exclusive choice for the Lower Dnipro: financing the reconstruction of the Kakhovka reservoir to restore the pre-war agricultural and energy status quo, or supporting a natural recovery scenario. Embracing natural recovery would require IFIs and policymakers to protect the newly forming floodplain ecosystems, prioritize decentralized energy resilience over vulnerable large-scale infrastructure, and implement sustainable, nature-based water management solutions aligned with modern European environmental standards.

Introduction

The Dnipro River hydropower cascade is a vital component of Ukraine's energy infrastructure, traditionally positioned as key to balancing the power grid, as well as a source of water for irrigation and, to some extent, domestic water transport. This is important to understand, as large-scale hydropower in Ukraine was not decisive in terms of electricity production and accounted for a maximum of 5% of total generation (prior to the full-scale war and the destruction it caused).

Starting in 1932, six hydroelectric power plants (HPPs) and, accordingly, six reservoirs were built along the Dnipro River, covering virtually the entire length of the river within Ukraine. The water resources management system in Ukraine was largely formed during the Soviet period and was based on the notion of the inexhaustibility of natural resources and the possibility of their large-scale use for economic needs. The main consumers of water resources in Ukraine are industry, agriculture, and municipal services, which account for about 99.7% of water withdrawal (over 11 billion m^3 per year) and rely primarily on water intakes from reservoirs. The last reservoir in the cascade — the Kakhovka Reservoir — was destroyed by Russian forces in 2023. Other hydropower plants also sustained varying degrees of damage from targeted missile strikes. As a result, ⅖ of the cascade's capacity was lost due to destruction (specifically, the destruction of the Kakhovka HPP and critical damage to the Dnipro HPP). However, prior to the start of the full-scale war, in 2016, the Ukrainian government approved a hydropower development program aimed at increasing installed capacity by 3.3 GW and raising the share of hydropower in electricity generation to 15.5% by 2026. The document has clearly lost its relevance by now, yet no changes have been made to it during the full-scale war, so it remains — albeit an unfounded one — an official declaration of intent to develop large-scale hydropower in Ukraine.

Today, this cascade finds itself at the epicenter of two major challenges: physical destruction and the need for a radical rethinking of approaches to its management in the context of the climate crisis. Large-scale hydropower has proven itself not only to be inconsistent with sustainable development goals but also to be a particularly vulnerable target of man-made hazards in wartime conditions.

This report aims to assess whether the current initiatives of Ukraine, its partners, donors, and banks truly align with the contemporary task of developing **a comprehensive vision** for the restoration and modernization of the Dnipro cascade, in which energy issues are not separated from environmental integrity, compliance with international obligations, water security, climate adaptation, and community well-being. The document focuses on the 2025 initiatives, which are most relevant for understanding the current positions of stakeholders.

The current state of the Dnipro River ecosystem and the historical transformation of its channel

The Dnipro River is one of Europe's largest river systems. It is approximately 2,200 km long, with over 1,000 km flowing through Ukrainian territory. The river basin covers a significant portion of the country and plays a key role in shaping the natural landscapes, hydrological regime, and biodiversity of Eastern Europe. In its natural state, the Dnieper was a large lowland river with a wide floodplain, numerous branches, islands, floodplains, and floodplain forests. It was precisely this structure of the river valley that formed unique complexes of wetland and floodplain ecosystems, ensuring exceptionally high biological productivity and species diversity.

Preserved sections of the natural river channel and floodplain

Despite the large-scale transformation of the river in the 20th century, some sections of the Dnipro have retained a relatively natural character of the riverbed and floodplain. These include, first and foremost:

The upper reaches of the Dnieper River within the Polissya region. In northern Ukraine (Chernihiv and Kyiv Oblasts), sections of the river valley with a relatively natural hydrological regime have been preserved. Floodplain meadows, oxbow lakes, swamp forests, and numerous islands are common here. Part of these territories is protected within the nature reserve fund, specifically as part of the Chornobyl Radiation-Ecological Biosphere Reserve and the Mizhrichynskyi Regional Landscape Park, as well as over 10 other nature conservation areas. The floodplains of this region are of great importance for maintaining wetland ecosystems, as well as serving as nesting sites and seasonal stopovers for waterfowl and shorebirds.

River stretches between reservoirs and in the upper reaches of reservoirs. In the upper reaches of each of the Dnipro reservoirs, where the river's current still retains its natural character, archipelagos of islands and fragments of natural floodplains have formed. Such areas are particularly characteristic of the upper reaches of the Kyiv, Kaniv, and Kremenchuk reservoirs. Here, remnants of natural habitats remain — floodplain forests, reed beds, meadows, and numerous shallow waters, which serve as important fish spawning grounds and bird gathering sites. All these territories are included in large nature conservation areas: the Dnipro-Oril Nature Reserve (Dnipropetrovsk Oblast), the regional landscape parks "Svitlovodskyi" (Kirovohrad Oblast), and "Kremenchuk Floodplains" (Poltava Oblast). In the city of Kyiv, all islands and the floodplain of the upper reaches of the Kaniv Reservoir are included in a series of nature reserves and the "Dnipro Islands" Regional Landscape Park. Most of the floodplain ecosys-

tems within Kyiv Oblast are included in four large nature reserves. In the Cherkasy region, the natural river channel and floodplain at the headwaters of the Kremenchuk Reservoir are part of the Kaniv Nature Reserve and 12 nature reserves with a total area of over 54,000 hectares. Additionally, in the Poltava region, the "Nizhniy Vorsklyansky" regional landscape park of local significance (over 23,000 ha) has been established in the Vorskla River delta. In the Zaporizhzhia region, the islands near Khortytsia Island are included in the "Dnipro Rapids" nature reserve and the "Velykyi Lug" National Nature Park.

The Lower Dnipro and the river delta. The largest natural complexes of floodplain ecosystems have been preserved in the lower reaches of the Dnipro. Here, a complex system of branches, channels, islands, and floodplains has formed, which is of exceptional importance for the conservation of biodiversity. These areas are protected, in particular, within the boundaries of the "Lower Dnipro" National Nature Park (83,000 ha). The Lower Dnipro floodplains are one of the largest complexes of wetlands in the steppe zone of Europe and play a key role as a nesting site, migration stopover, and wintering ground for birds.

The Importance of the Dnieper's Natural Areas for Biodiversity (and Cultural Heritage)

The Dnieper floodplain ecosystems are characterized by a high level of biodiversity. They include various types of habitats — floodplain forests, meadow ecosystems, marshes, oxbow lakes, and shallow waters. It is the mosaic nature of these environments that ensures a high species diversity of plants, invertebrates, fish, amphibians, reptiles, and birds.

These ecosystems are particularly important for fish fauna. In its natural state, the Dnipro was one of the main migration routes for anadromous fish species of the Black Sea basin, particularly sturgeons. Floodplain areas also served as key spawning and rearing grounds for juvenile fish of many other species. Additionally, shallow waters and floodplains provided a rich and diverse food supply. Equally important is the value of aquatic invertebrates (not only as a food source). Even under current conditions, when the natural flow of the Dnieper River in Ukraine has almost disappeared, at least 12 superendemic species of aquatic invertebrates — known only in this location and nowhere else — are still found in the river delta.

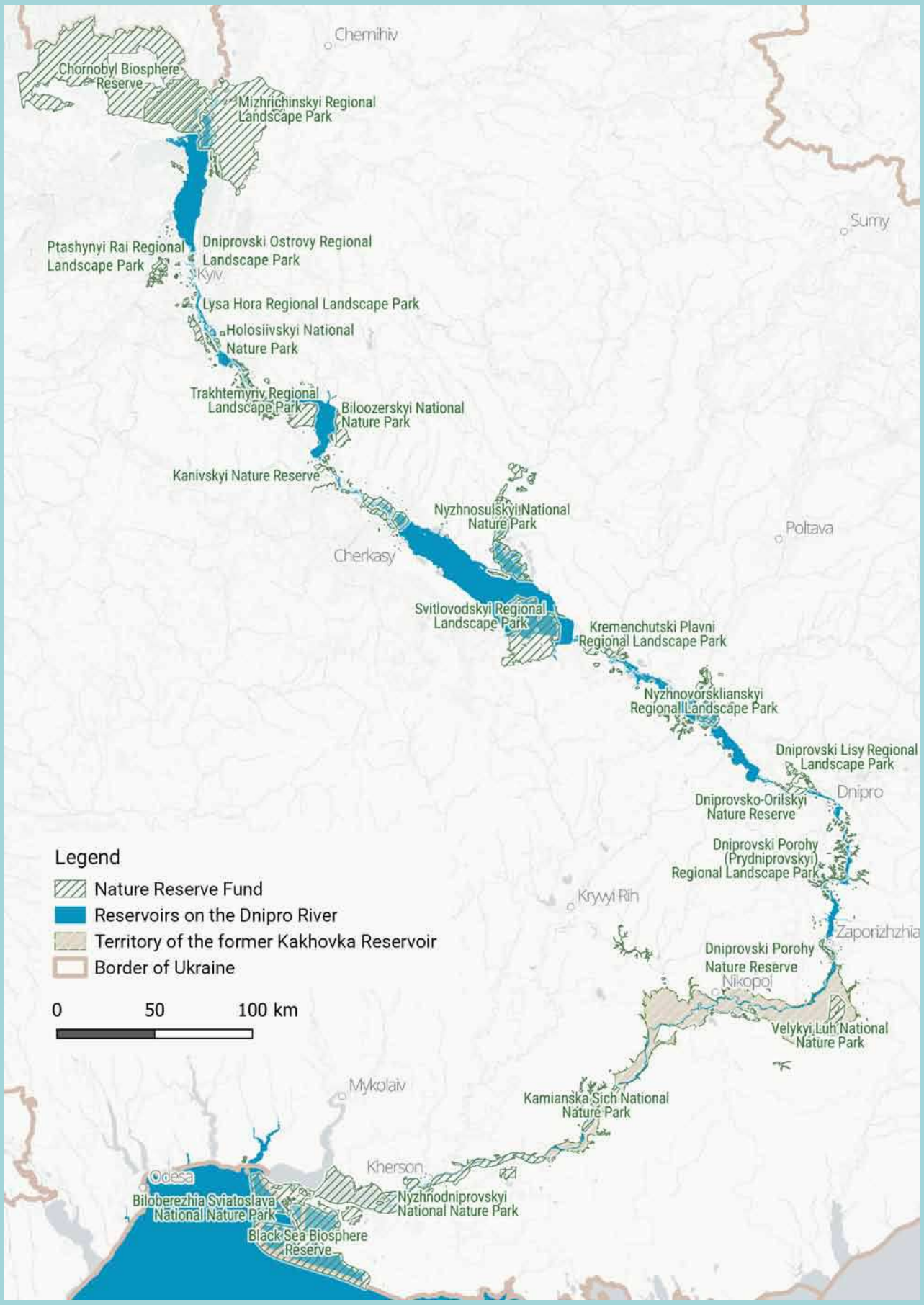
Among other animals for which this territory played a significant role on a European scale were the European otter (*Lutra lutra* L.) and the European desman (*Desmana moschata* L.). Following the creation of the cascade of reservoirs, the populations of these species declined significantly (and the desman has retained populations only in the valleys of certain Dnieper tributaries).

The Dnipro floodplain is also of great importance for avifauna. The river valley is part of one of the main bird migration routes in Eastern Europe — the so-called Dnipro Migration Corridor — one of the most important in Europe. Hundreds of thousands of waterfowl and shorebirds congregate here during different seasons.

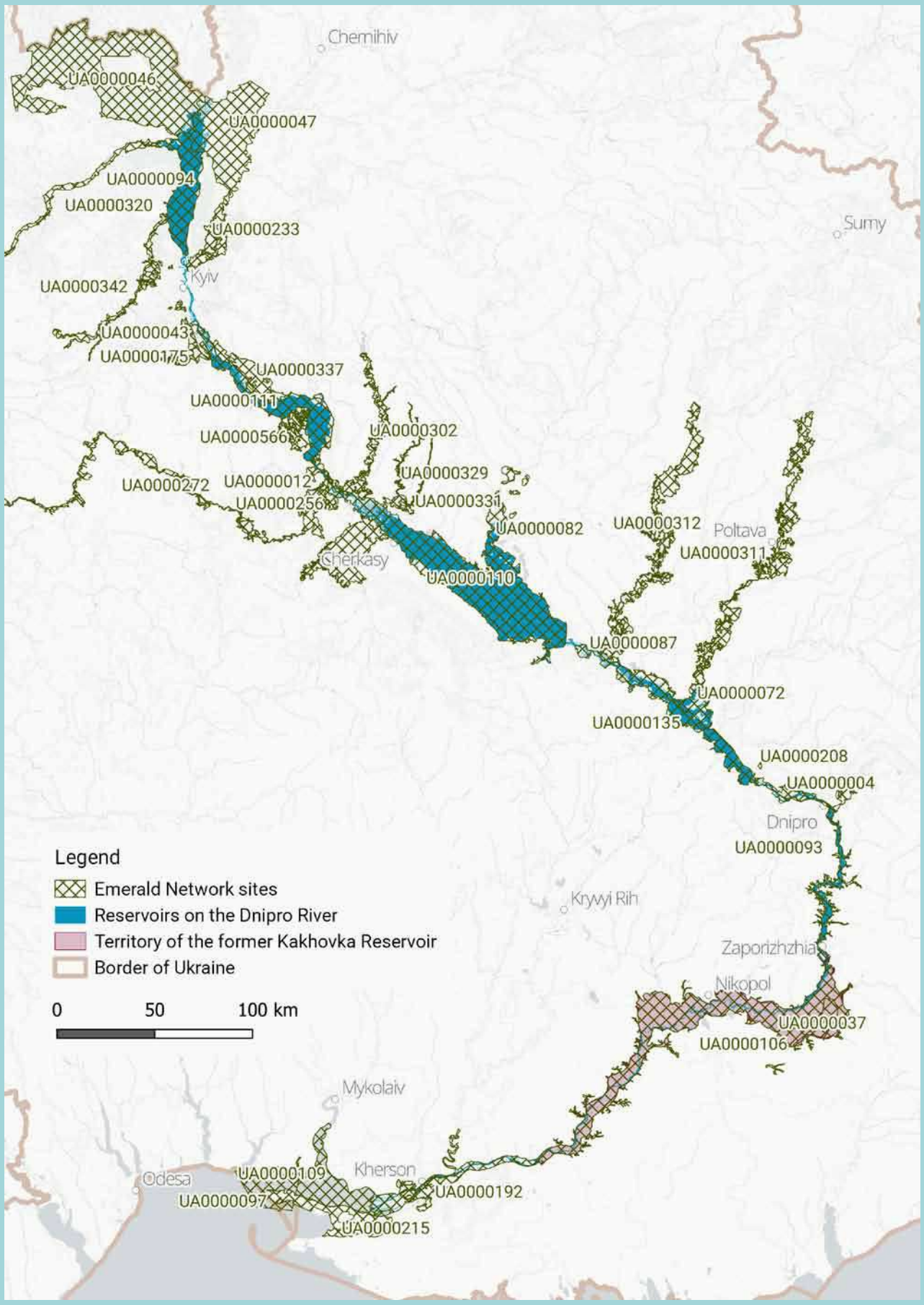
The importance of the Dnipro Cascade for biodiversity is enshrined in legislation: the Dnipro Ecological Corridor is defined in the Law of Ukraine "On the National Program for the Formation of an Ecological Network for the Period 2002–2015." Despite the funding timeframe defined by this law, it not only outlines measures that were funded at the national level through 2015 but also establishes key concepts regarding the ecological network, specifically the Dnipro Ecological Corridor as an element of the national-level ecological network.

Additionally, the entire cascade of reservoirs is included in the European Emerald Network (each of the reservoirs, as well as the free-flowing sections in northern Ukraine and the river delta in the south, are separate territories of the Emerald Network). Within the cascade, there are also three wetlands of international importance protected by the Ramsar Convention.

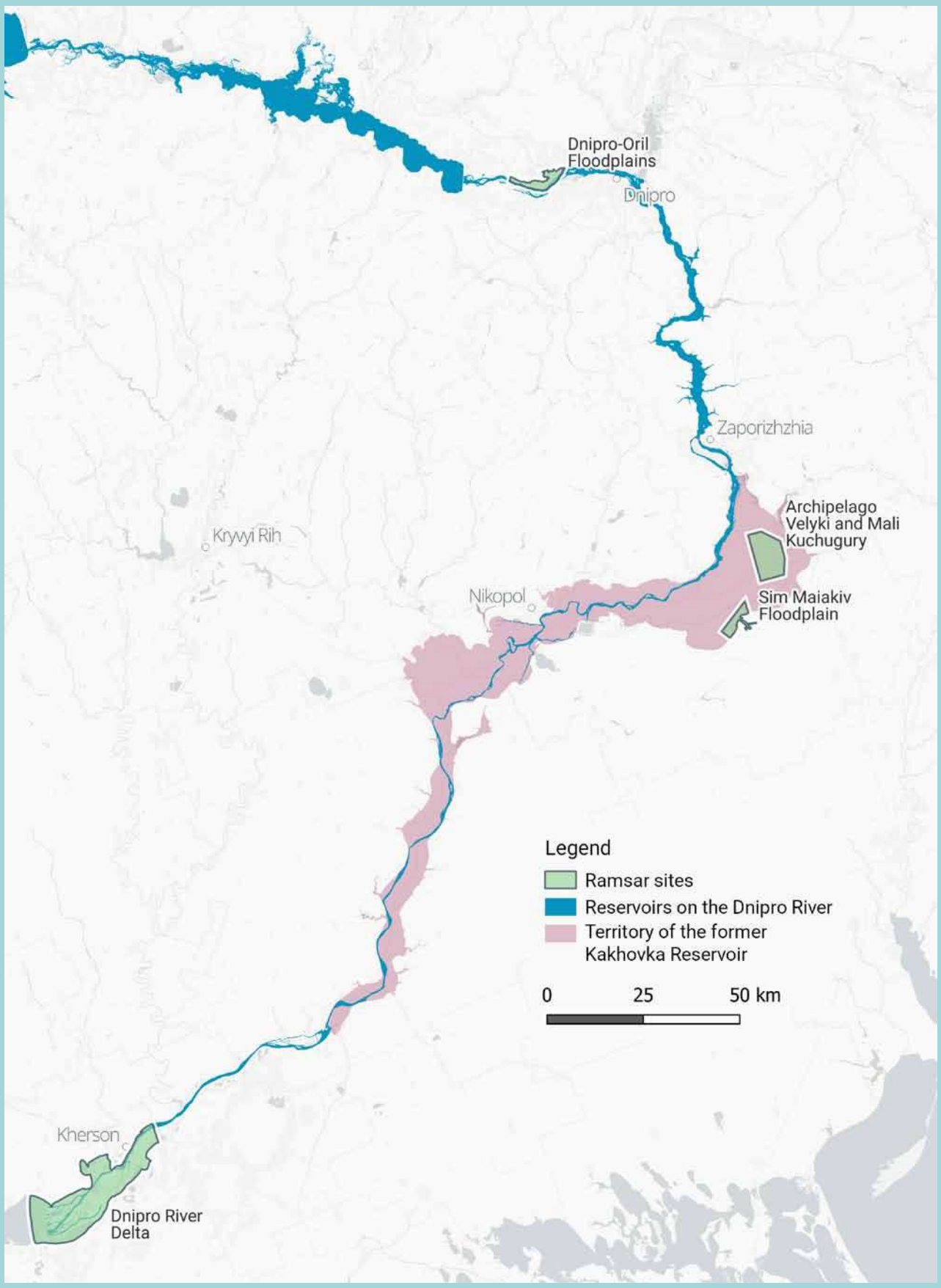
Scheme for the location of the nature reserve fund in the Dnieper River Valley



Scheme for the location of the Emerald Network in the Dnieper River Valley



Scheme for the location of wetlands of international importance protected by the Ramsar Convention in the Dnieper River Valley



The Historical Transformation of the Dnipro and the Creation of the Reservoir Cascade

Despite the river's natural value, most of its course within Ukraine was radically transformed in the mid-20th century. Between 1927 and the 1970s, a cascade of six large hydroelectric power plants and reservoirs was built on the Dnipro. As a result, approximately 82% of the river's length within Ukraine was regulated by hydraulic structures

The creation of reservoirs led to the flooding of vast areas of floodplain ecosystems. The most significant loss was the flooding of the Velykyi Luh (Great Meadow) — one of the largest floodplain forest complexes in the steppe zone of Europe. Before the flooding, this area was a mosaic of floodplains, floodplain forests, meadows, and wetlands, which were of great importance for biodiversity and seasonal bird migrations.

The construction of the cascade of reservoirs led to fundamental changes in the river's hydrological regime. Natural flood cycles were replaced by artificial regulation of flow. This affected not only the areas directly flooded by the reservoirs but also the lower reaches of the river. In particular, the discharge regime from the hydroelectric power plants created artificial fluctuations in water levels, which altered natural processes in the delta's ecosystems.

At the same time, even in its transformed state, the Dnieper river system remains of great importance for biodiversity. In the upper reaches of the reservoirs and the deltas of the tributaries, archipelagos of islands and fragments of natural floodplains have formed, which have high conservation value. As mentioned above, virtually the entire area of these sites is included in national-level protected areas, and 100% of the area is part of the European Emerald Network.

The open water surface of the reservoirs has also, to some extent, acquired new ecological significance. It has become part of one of Europe's largest migratory corridors for birds. After the cascade was created, the nature of migration patterns changed somewhat: waterfowl extended the duration of their stops at the reservoirs, and some species began using them for wintering as well.

Archaeological finds from the era of the Ukrainian Cossacks following the lowering of the water level in the Kakhovka Reservoir (Source: Radio Liberty).

Conversely, species associated with coastal shallow waters, particularly waders, have largely lost suitable stopover sites during migration.

At the same time, the creation of the cascade virtually eliminated the Dnieper's role as a spawning river for migratory fish species of the Black Sea basin, particularly sturgeon. The barrier effect of the dams disrupted the historical migration routes of these species.

Furthermore, the flooding of the Dnipro Valley by reservoirs has resulted in the loss of extremely important historical and cultural assets and historical landscapes of national significance. The creation of the Kakhovka Reservoir resulted in one of the most extensive losses of historical and cultural heritage in Ukraine, with long-term consequences for national identity and historical memory. The territory of the Velykyi Luh was not merely a natural complex, but a key center for the formation of Ukrainian statehood and self-identity, directly linked to the existence of the Zaporizhzhia Sich. It was here, throughout the 16th–18th centuries, that the Sich functioned as military-political centers based on democratic principles and became a symbol of the struggle for freedom, a symbol that retains its significance for Ukrainian society to this day. It is precisely this chapter of Ukrainian history that is considered the starting point of its statehood and is therefore of paramount importance for the self-identification of Ukrainians.

Kakhovka HPP guarded by Russian occupation army. 2022

The draining of the reservoir revealed a vast array of archaeological artefacts and even triggered a temporary boom in looting.

The flooding of this territory in the past meant the physical destruction of a unique historical landscape, in which natural conditions were an integral part of the functioning of the Cossack community. The Great Meadow served not only as the location of the Sich settlements but also as the environment that ensured their viability — providing natural shelter, a resource base, and a space for social organization. Thus, it was not individual monuments that were lost, but an entire cultural landscape that cannot be recreated.

The scale of the loss of tangible heritage deserves special emphasis. In 1957, villages inhabited by descendants of the Zaporizhian Cossacks — who were the bearers of historical memory regarding the formation of Ukrainian statehood — disappeared beneath the waters of the reservoir. The resettlement of these communities was accompanied by the destruction of their traditional way of life and cultural continuity. At the same time, the construction itself was carried out hastily and without proper archaeological research, which means the loss of a significant portion of the archaeological layer without its documentation or study. In fact, an irreplaceable layer of historical data on the settlement, economy, and military organization of the region was destroyed.

Moreover, many historians provide compelling evidence that the creation of the Kakhovka Reservoir may have served an ideological function — the destruction of a spatial symbol of Ukrainian resistance and the subsequent assimilation of the descendants of the Cossacks. In this context, the losses have not only a cultural but also a political dimension: the elimination of the material foundation of historical memory significantly weakens society's connection to its own past.

The scale and irreversibility of these losses allow them to be viewed as one of the most compelling arguments against the further implementation of similar hydropower projects.

Environmental Consequences of the Destruction of the Kakhovka HPP and Prospects for the Restoration of the Lower Dnieper Ecosystems

The destruction of the Kakhovka Hydroelectric Power Plant dam in June 2023 became one of the largest man-made disasters in Europe in recent decades. As a result of the dam's destruction, the Kakhovka Reservoir — one of the components of the Dnipro Hydroelectric Cascade — was destroyed. The event led to massive flooding in the lower Dnieper basin, as well as a rapid drop in water levels across the vast reservoir area. This caused a radical restructuring of natural processes throughout the Lower Dnieper region.

The immediate environmental consequences of the disaster manifested in several interconnected processes. The first stage was a catastrophic flood in the lower reaches of the river, which led to the inundation of settlements, natural areas, and agricultural lands. This physically destroyed most of the terrestrial fauna and part of the vegetation, and also led to a large amount of pollutants entering the water from the flooded areas (including industrial facilities, landfills, gas stations, etc.). At the same time, within a short period, a massive amount of bottom sediments, man-made pollutants, and organic matter — which had accumulated there over decades — was washed out of the reservoir. This led to large-scale pollution of the waters of the Dnipro-Bug Estuary and the northwestern part of the Black Sea. Studies show that following the dam's collapse, the hydrological and hydrochemical parameters of the water masses in the lower reaches of the river and in the area where they flow into the sea have changed.

At the same time, the destruction of the reservoir also led to a fundamentally different process — the restoration of natural ecosystems across a vast territory that had been flooded by the artificial reservoir for decades. After the reservoir disappeared, over two thousand square kilometers of the former riverbed were exposed. A significant part of this territory historically belonged to the natural floodplain complex of the Velykyi Luh — a unique system of floodplains, islands, floodplain forests, and meadows that was flooded during the creation of the Kakhovka Reservoir in the 1950s. Initial studies showed that new plant communities began to form on the exposed areas as early as the first few months, indicating the onset of natural succession processes. Scientists began monitoring these processes in various parts of the former reservoir, particularly in areas near Zaporizhzhia, Khortytsia Island, and in the bays downstream of the dam. The results of the observations indicate the rapid formation of primary vegetation and the gradual restoration of natural habitats on the site of the former reservoir. Already during the first year of observations, rapid vegetation recovery and the formation of a mosaic of forest and wetland habitats were recorded, a process that continued throughout 2024–2025. Recent studies in the fall of 2025 showed that a significant portion of the territory

is covered with young trees up to 7 meters tall. It can be stated that, as of now, the young forest of Velykyi Luh is the largest natural forest in the Steppe zone of Ukraine. It is also important to note that the natural conditions and characteristics of the floodplain willow-poplar forest ecosystem make it the most climatically resilient type of forest in Ukraine.

This process is extremely important in the context of restoring the natural ecosystems of the Lower Dnipro. Prior to the creation of the Kakhovka Reservoir, the river valley in this region constituted one of the largest floodplain systems in Europe. Velykyi Lug played a key role in maintaining biodiversity, provided spawning grounds for fish, served as an important nesting and migration site for birds, and formed a complex system of wetlands. The flooding of this area in the 1950s led to the loss of a significant portion of natural habitats and a radical change in the hydrological regime of the Lower Dnipro.

The destruction of the hydroelectric dam in 2023 effectively opened the possibility for a partial restoration of these natural processes. The very first spring flood in 2024 demonstrated that the natural processes of periodic flooding of the floodplain can indeed be sustained even under the operation of the remaining part of the reservoir cascade. Specifically, in March–April 2024, up to 60% of the territory of the former Kakhovka Reservoir was flooded. The reason for this is that only the Kakhovka Reservoir was used to manage the spring flood and store water, while the other reservoirs lack this capacity and primarily allow water to pass through. Consequently, for the Dnipro River valley downstream of the Dnipro HPP dam, the flood passage occurs after the destruction of the Kakhovka HPP in practically the same way as it would have occurred without reservoirs at all.

Source: site of Copernicus (European Union's Space programme), images from the Sentinel-2 L2A satellite. Date of the first - May 6, 2023, date of the second - September 4, 2025

Instead of a large artificial reservoir, a new river-floodplain landscape is gradually forming, in which the river restores its natural network of channels, islands, and shallow areas. Such ecosystems are characterized by significantly higher levels of biodiversity and ecological stability compared to reservoirs. At the same time, the region's hydroclimatic conditions are changing. Following the disappearance of the large artificial reservoir, the temperature regime of the water and surrounding areas is changing: in the spring, the water in the Lower Dnieper warms up faster, and in the fall it becomes colder, which is closer to the natural state of the river ecosystem. The formation of floodplain vegetation, particularly willow forests, has the potential to contribute to cooling and humidifying the air during the summer months in the future, which is an important factor in climate stabilization for the steppe region

Today, various scenarios for the future of the former Kakhovka Reservoir area are being actively discussed in Ukraine, including the restoration of the Kakhovka Hydroelectric Power Plant or the construction of new hydraulic structures. The implementation of such projects would mean the re-flooding of significant areas where natural restoration processes of the Lower Dnipro floodplain ecosystems have already begun.

For international financial institutions that may participate in financing the reconstruction of Ukraine's energy infrastructure, these processes create a fundamentally new situation. The potential restoration of the Kakhovka HPP dam would have long-term consequences not only for the energy sector but also for the ecological future of the entire Lower Dnipro basin. The re-creation of a large reservoir would mean the destruction of natural ecosystems that have already begun to recover across an area of over 2,000 square kilometers, and the loss of a unique opportunity to restore the natural floodplain landscape that existed here until the mid-20th century.

At the same time, modern approaches to river system management in Europe are increasingly focused on restoring natural river processes, reducing flow regulation, and enhancing the ecological resilience of river valleys. Many countries are implementing programs to dismantle or modify dams, aimed at restoring natural floodplains and fish migration routes. In this context, developments on the Lower Dnieper have created a unique opportunity to reevaluate approaches to managing this river system.

Thus, despite its massive humanitarian and economic consequences, the destruction of the Kakhovka HPP dam has simultaneously created a historic opportunity to restore the natural ecosystems of the Great Meadow and to form one of the largest river-floodplain natural complexes in the steppe zone of Europe. In this regard, any decisions regarding the financing of new hydraulic structures or the restoration of the reservoir must be made only after a comprehensive assessment of their environmental, social, and economic consequences. Such an assessment must take into account not only energy needs but also the potential for the natural restoration of the Lower Dnipro's ecosystems, which has already begun following the disappearance of the Kakhovka Reservoir.

Renown botanist Dr.Yakov Dydukh in the new willow forest on the bottom of Kakhovka reservoir 2024 (photo by EPL)

Support for the further restoration and development of hydropower and water supply

During the full-scale war, Russian forces carried out numerous attacks on energy facilities in the Dnipro River cascade. Guided air-to-ground missiles, ballistic missiles, and UAVs were used. As a result, hydroelectric power plant dams, substations, and other energy infrastructure facilities sustained damage of varying severity.

- The Kakhovka HPP was completely destroyed (damaged in November 2022, destroyed in June 2023); the power plant and dam were destroyed by an explosion. This was the most serious single incident, which caused catastrophic flooding downstream, a loss of approximately 343 MW of generating capacity, and significant environmental damage.

- Damaged Dnipro Hydroelectric Power Plant (March 2024, May 2024). On March 22, 2024, numerous rocket strikes (some reports indicate eight direct hits) caused serious damage to electrical equipment, hydroelectric units, and buildings. Both plants (HPP-1 and HPP-2) were affected; the plant was shut down. A fire broke out. May 8, 2024 (and related attacks in the spring of 2024): additional strikes resulted in the plant no longer operating; Ukrhydroenergo reported that two HPPs (including this one) were taken out of service due to critical damage resulting from attacks in early May.

- Kaniv HPP damaged (2024). In March 2024, the plant was damaged by missile strikes. The impact sites were inspected on July 18, 2024, by a German diplomatic delegation (led by Ambassador Martin Jäger) together with Ukrhydroenergo. The company discussed urgent restoration needs; the plant is part of the broader pattern of strikes on all Ukrhydroenergo facilities.

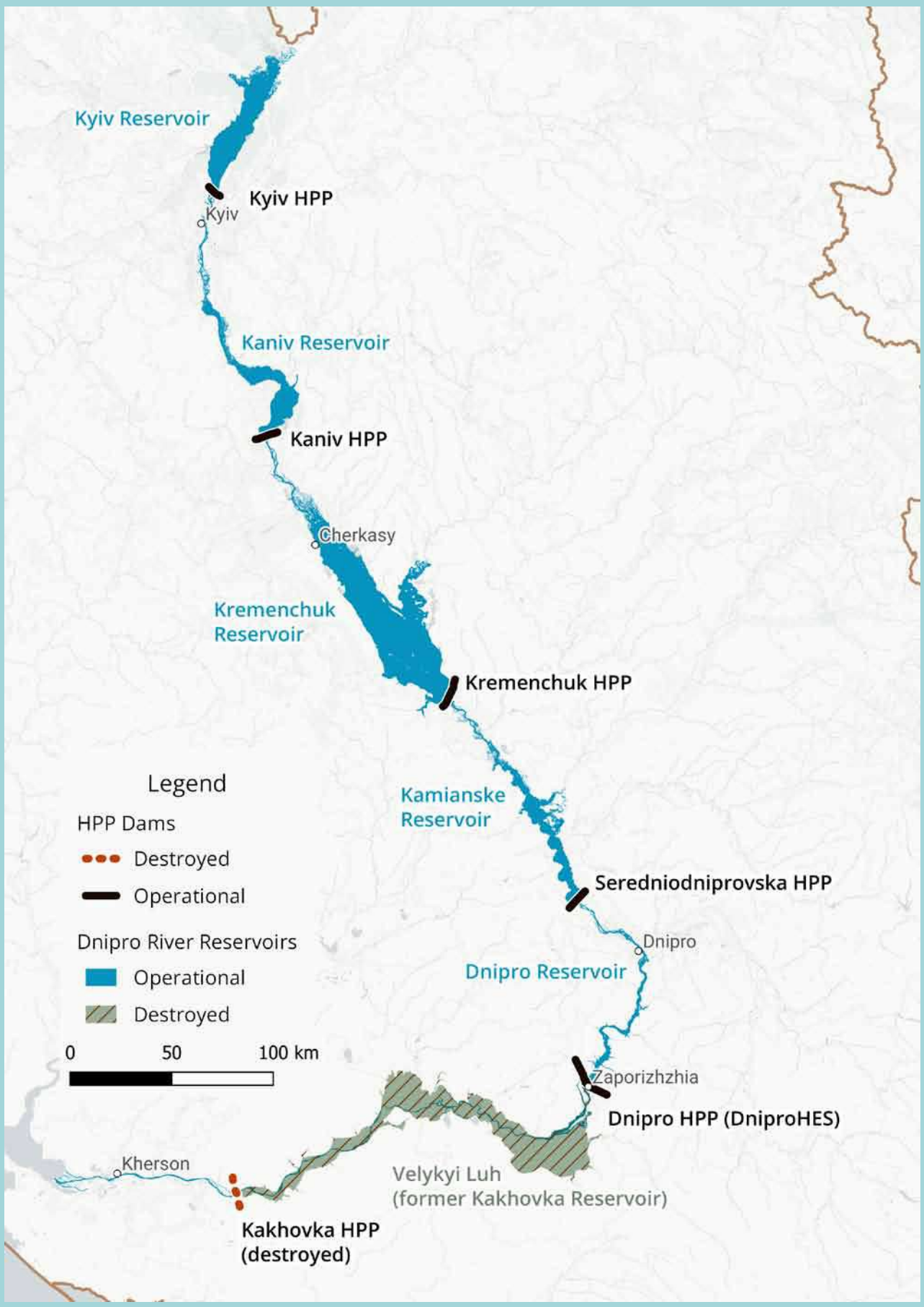
- Damaged Kremenchuk HPP (2024–2025). November 8, 2025: struck by 2 missiles and 15 drones (Geran-2/Shahed type). Significant damage was confirmed; the Ukrhydroenergo supervisory board conducted an on-site inspection on November 11, 2025, to assess the extent of the damage and restoration needs. This aligns with the trend of intensified attacks in 2025 on remaining hydropower capacity.

- Kyiv HPP damaged (2024). August 26, 2024: became the target of a massive missile and drone attack. Direct hits caused damage to the plant (debris had to be cleared). There was no threat of a dam breach or flooding of downstream areas. Ukrhydroenergo confirmed the strikes but noted that the dam remained safe.

- Damaged Serednyodniprovskaya HPP (2024–2025), October 23, 2025: combined attack, over 20 explosions, confirmed damage.

- Damaged Dniester HPP and Dniester PSP (October 2022, March 2024, March 2026), on the Dniester River. October 31, 2022: A missile strike caused damage and a fire at the facil-

Location diagram of reservoirs and hydroelectric power plants of the Dnieper cascade



ity (one of the first recorded attacks on hydropower infrastructure). March 7, 2026: The first massive, targeted attack (4 Kalibr cruise missiles + 11 Shahed-type drones). Non-critical structural damage to the station/pumped-storage plant, but a leak of transformer oil into the Dniester River caused cross-border pollution (an oil slick reached Moldova, causing environmental concerns and disruptions to the water supply). The complex is operated by Ukrhydroenergo; the spill was confirmed by both Ukrainian and Moldovan authorities.

By early 2026, the total number of missile and drone strikes had exceeded 260; over four years of war, the company's facilities have been hit by more than 260 missile and drone strikes; by the end of 2025, the Ministry of Energy confirmed that all major thermal and hydroelectric power plants had been damaged. In March 2026 the annual report on global renewable energy capacity by International Renewable Energy Agency (IRENA) revealed that while in 2021 Ukraine had 6662 MW of hydropower on-line, by 2025 it suffered more than 55% reduction and retained only 2950 MW.

Bottom of Oskil River Reservoir (multipurpose facility including small HPP) severely damaged during the battle for Kharkiv in 2022.
by Mariia Solodovnyk, Suspilne Ukraine JSC

The Ukrainian government positions the Dnipro hydropower cascade as one of the key priorities for development and recovery to ensure energy security and restore the power grid following a full-scale war. In 2024–2025, the Government and the state-owned company Ukrhydroenergo discussed with international partners support for the restoration of the Dnipro HPP, which suffered serious damage during rocket attacks, and emphasized the need for assistance in rebuilding.

By Resolution of the Cabinet of Ministers of Ukraine No. 753-r of August 23, 2022, "On the Approval of the Strategic Development Plan of the Private Joint-Stock Company 'Ukrhydroenergo' for 2023–2027" (as amended on January 3, 2024, No. 13-r), the Strategic Development Plan of the private joint-stock company "Ukrhydroenergo" for 2023–2027 was approved. Due to wartime conditions, this document is classified, but from indirect sources, it is clear that it sets out five objectives:

- Reconstruction of the Dnipro Cascade of Hydroelectric Power Plants
- Completion of the Dniester Pumped Storage Power Plant
- Construction of the Kaniv Pumped Storage Power Plant
- Construction of the Kakhovka HPP-2
- Implementation of the project "Ukraine – Enhancing the Resilience of the Power System for Integration with the European Power System (Installation of Hybrid Power Generation Systems at PJSC "Ukrhydroenergo")"

At least three of the five "goals" of this plan are criticized by the public as incompatible with modern environmental views. Furthermore, the "Strategic Plan" refers to the development of large-scale hydropower as "enhancing the resilience" of the energy system, even though this very sector has proven to be the most vulnerable under wartime conditions.

Outdated hydropower projects with high social and environmental risks

However, a paradoxical situation has arisen in which hydropower — which involves the creation of reservoirs that run counter to environmental policy goals, and whose past consequences are being actively addressed in Western countries — is being positioned as the primary avenue for securing funding to rebuild Ukraine's energy sector. Large-scale hydropower construction is being promoted not only on the Dnipro but also on other major rivers. It is also worth mentioning the projects to complete the Tashlyk Pumped Storage Power Plant in the "Buzky Gard" National Park and plans to build an entirely new Kaniv Pumped Storage Power Plant — projects that are completely unacceptable in today's world. Both projects date back to the 1970s and were not implemented even then for many reasons. These projects do not meet modern environmental standards or legislation in general; however, the possibility of reviving these outdated ideas appears to the energy sector as a very attractive opportunity to secure funding. In recent years, in particular, efforts to obtain a positive EIA conclusion for another increase in the water level in the Tashlyk PSP reservoir and the subsequent flooding of the Buzky Gard National Park territory with water from the Oleksandrivka Reservoir have intensified significantly.

The "Tashlyk Pumped Storage Hydro Power Plant" Case

The history of the issue regarding the raising of the water level in the Oleksandrivka Reservoir (the lower reservoir of the Tashlyk Pumped-Storage Hydro Power Plant) has been ongoing for several decades and is linked to plans to complete the construction of the Tashlyk Pumped-Storage Power Plant (PSHPP) by raising the reservoir's normal head level from ≈16 m to the designed values (up to ≈20.7 m), which would increase the volume of active water volume for the plant's operation in energy storage mode. Historically, the PSHPP project has been under development since the early 1980s, however, raising the reservoir level was not provided for in the initial documentation and subsequently sparked numerous disputes due to the potential flooding of valuable natural and cultural landscapes in the Southern Bug River valley, including parts of the "Buzky Gard" National Nature Park and historical heritage sites. It is precisely these risks that have been the subject of years of assessments and environmental reviews, repeated refusals to approve the EIA, and active public and expert criticism due to insufficient justification for the need to raise the water level, disregard for alternatives, and potential negative consequences for biodiversity, habitats, and cultural heritage sites.

Regarding the environmental impact assessment (EIA) for the completion of the Tashlyk Pumped Storage Power Plant and the potential raising of the Oleksandrivka Reservoir's water level, there are significant and well-documented issues that threaten the valuable natural complexes of the Buzky Gard National Nature Park. During the full-scale war, new EIA reports were submitted three times, and each report contained numerous violations: they contained outdated or incomplete data on plant and animal species listed in Ukraine's Red and Green Books, ignored the cumulative impact of the project on the environment, and failed to provide an adequate analysis of alternative development options. Due to these systemic errors, the Ministry of Ecology and Natural Resources once again refused to issue a positive EIA conclusion in 2025, but risks remain, as the developer may submit a new report without addressing the substantive comments.

Given that the area planned for flooding by energy sector is a habitat for super-endemic plants listed in Resolution 6 of the Bern Convention, and the area is a critical site for their conservation within the European Emerald Network, a case against Ukraine was opened in 2020 before the Standing Committee of the Bern Convention, according to a statement by the Ukrainian Nature Conservation Group.

The "Kaniv Pumped Storage Hydro Power Plant" Case

The "Kaniv Pumped Storage Hydro Power Plant" (Kaniv PSHPP) project was initiated back in the 1980s as part of the Dnipro cascade of hydroelectric and pumped storage power plants to balance the power grid. Construction began at the end of the Soviet era, but due to the economic crisis of the 1990s, the project was effectively put on hold in its early stages. In the 2000s and 2010s, the government periodically revisited the idea of completing the plant as a measure of energy security and integration into ENTSO-E. At the same time, the project has faced persistent criticism from scientists and environmental organizations due to the risks of impact on the slopes of the Kaniv Mountains, the landscapes of the Middle Dnipro, the territory of the nature reserve fund, and cultural heritage sites in the vicinity of the city of Kaniv. Issues regarding slope stability, flooding, and the potential impact on the Dnipro's ecosystems have been the subject of years of debate, environmental assessments, and public campaigns.

In recent years, the topic of the Kaniv PSHPP has resurfaced in the context of post-war reconstruction and the decarbonization of the energy sector. State-owned energy companies have declared their intention to resume construction of the facility as a strategic tool for balancing renewable generation. At the same time, environmental organizations emphasize the need for a comprehensive and accurate environmental impact assessment, an analysis of alternatives (including distributed energy storage systems), as well as consideration of geological risks and impacts on the Emerald Network and the Protected Natural Areas in the region. Experts emphasize that any decisions regarding the resumption of construction must be made in compliance with environmental impact assessment legislation, Ukraine's international obligations, and with consideration of the long-term environmental consequences for the Dnipro Valley.

Despite the problems that the construction of a new reservoir will entail, PJSC "Ukrhydroenergo" is announcing a hydroelectric power plant of even greater capacity at the site of the Kakhovka HPP (or the completion of an additional complex of hydroelectric units, "Kakhovka HPP-2") in order to use it for peak-load operation. It will generate 550–600 megawatts of electricity instead of the 335 megawatts destroyed in 2023. In some instances, it has been mentioned that the new HPP will have four times greater capacity.

As of early 2026, the Kakhovka HPP-2 still appears on the list of projects (in fact, among three projects) on the "Ukrhydroenergo" website.

Environmental Impact Assessment (EIA) processes regarding the creation of new reservoirs on the Dniester River have also intensified. In all these cases, the focus is on new hydropower construction (not on war-damaged facilities) and on areas significantly distant from the combat zone. Therefore, it cannot be ruled out that the energy sector will attempt to revive projects in the near future, not only within the Dnipro cascade.

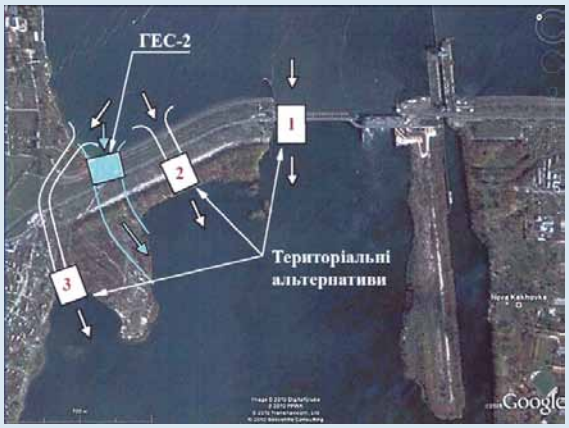
The development of large-scale hydropower is enshrined in a number of strategic documents. Most often, new initiatives are framed through **the lens of the destroyed Kakhovka HPP**.

This is not due to the significance of restoring and expanding the Kakhovka HPP for the country's energy sector — its contribution is quite modest and accounts for less than 1% of Ukraine's power grid capacity. From the energy sector's perspective, it is also important that the Zaporizhzhia Nuclear Power Plant (ZNPP) was built with the intention of using the Kakhovka Reservoir as a water source for its cooling system. However, it is now quite clear that for the ZNPP, should it be restarted, there are many other options for replenishing water reserves in the cooling pond — ranging from drawing water directly from the Dnipro River to replenishing it with alluvial groundwater from its floodplain. Far more important for the Ukrainian government and numerous interested agencies and companies is the restoration of water supply to over 500,000 hectares of irrigated land, where grain and sunflowers have been grown since

What is the Kakhovka HPP-2

The "Kakhovka HPP-2" project aimed to create additional power capacity based on the existing dam of the Kakhovka HPP. Between 1969 and 1974, the Dnipro HPP-2 was similarly built into the dam of the Dnipro HPP.

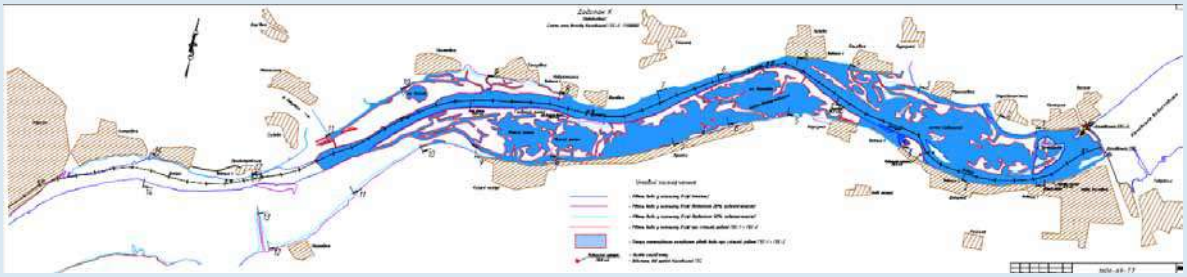
The installed capacity of the Kakhovka HPP-2 was to be 250 MW (the Kakhovka HPP-1 had a capacity of 335 MW). A statement of intent for the new construction was announced as early as November 2014, and in 2017, the Cabinet of Ministers of Ukraine approved the project's feasibility study.



Layout of the Proposed Kakhovka HPP-2

An important feature of this project is that the 40% increase in the plant's capacity would have resulted in virtually no increase in electricity generation, but would have merely provided additional peak capacity.

The project required an increase in the dam's discharge capacity in Nova Kakhovka, which would lead to greater water releases downstream on the Dnipro River. Specifically, sudden changes in water levels near the Kakhovka hydroelectric complex dam would amount to 1.94 m, and near the city of Kherson — 0.42 m. Under such hydrological conditions, one-third of the territory of the "Lower Dnipro" National Nature Park would be regularly submerged, and the rest of its territory would experience significant daily water level fluctuations. Meanwhile, the entire area that would be subject to periodic flooding is part of the Emerald Network. For this reason, the project has been criticized by the public and scientists.



Flooding map of the "Nizhnodniprovsky" National Nature Park in the event of the launch of the Kakhovka HPP-2

At the same time, a Ukrainian law came into effect in 2017 requiring the project developers to conduct an environmental impact assessment (the Law of Ukraine "On Environmental Impact Assessment"). Despite the obvious threat that the Kakhovka HPP-2 will pose to the ecosystems of the Lower Dnipro, scientific conclusions state that daily fluctuations in water levels will not harm even terrestrial animals. In 2021, the Ministry of Ecology issued a positive EIA conclusion for this project, rejecting public comments. However, construction of the Kakhovka HPP-2 did not begin due to the full-scale invasion by Russian troops in 2022.

Soviet times. Officials view the revival of the archaic model of irrigated agriculture in these areas as the fastest path to strengthening exports of grain and other primary agricultural products, which are the country's main source of foreign exchange earnings. At the same time, it is usually overlooked that accession to the European Union will create a completely different system of incentives for the development of more efficient agriculture. Most likely, the most important considerations for the government at present are short-term geopolitical ones arising in the context of intense foreign policy pressure aimed at concluding an agreement with Russia as quickly as possible — even at the cost of fundamental concessions. It is precisely in this context that the Kakhovka Hydroelectric Power Plant is mentioned alongside the Zaporizhzhia Nuclear Power Plant in various versions of the "draft peace treaty" at the end of 2025. Since the actual line of combat runs through the territory of the former reservoir and along the banks of the Dnipro River above and below it, an agreement based on the status quo will make the conditions for the future de facto joint use of the Dnipro one of the key issues. In this context, the restoration of the Kakhovka Reservoir could be viewed by officials as a long-term compromise that would contribute to lasting peace, as it would ensure water supply to Crimea and other occupied areas of eastern Ukraine, thereby, in theory, reducing the grounds for further Russian aggression.

Legally, even the destroyed Kakhovka HPP remains the property of the state-owned company "Ukrhydroenergo," so any attempts to restore the former dam to recreate the reservoir can only be carried out within the framework of supporting this company's operations.

In fact, the destruction of the Kakhovka HPP and damage to the structures of a number of other HPPs (which led to the cessation or limitation of their power generation) was used as a catalyst for efforts to secure funding for the development of large-scale hydropower.

In reality, this form of power generation — the most environmentally unacceptable — is being positioned under such conditions as the primary and highest priority for restoration. Nominally, it does indeed meet a number of criteria: it is precisely the large hydropower plants that were damaged during the war, they are used as reserve capacity, can be restored if funding is available, and all of them (except for the Kakhovka HPP) are already accessible for restoration work.

We assume that the key criterion in the state's choice of large-scale hydropower as a priority sector is that it is under the state's direct control, unlike, for example, wind farms, thermal power plants, and solar power plants, which are privately owned enterprises. Therefore, the state can only secure funds for energy sector restoration by obtaining them specifically for the restoration of hydropower plants or thermal power plants. Of course, Ukraine and its partners are simultaneously pursuing vigorous efforts to construct additional reactors at the sites of the existing Rivne and Khmelnytskyi NPPs; however, this is a topic for a separate study, as it involves different causes, levers of influence, and financing mechanisms.

Decisions by the Ukrainian Government

Following the destruction of the Kakhovka HPP dam, the Government and the Verkhovna Rada (Parliament) of Ukraine adopted various decisions to mitigate the consequences, construct facilities to replace those destroyed, and restore the Kakhovka Reservoir in the future. In this section, we analyze these documents and, above all, with particular focus, provide information on those adopted in 2025 and those that were in effect as of the end of 2025.

Decisions on funding measures to address the consequences of the terrorist attack

It is advisable to analyze government activities in 2025 exclusively through the lens of decisions adopted during the 2023–2024 period, since it is precisely these decisions, which remain in effect to this day, that determine the

Ukrainian state's activities in the sphere of restoring and developing the Dnipro cascade of hydroelectric power plants.

On the very day of the terrorist attack, the Cabinet of Ministers of Ukraine(CMU) approved the implementation of an "experimental project" to construct a series of main water pipelines (Resolution No. 566 of June 6, 2023). Initially, the project aimed to restore water supply in 2023 to settlements that drew water from the Kakhovka Reservoir. The project's funding (8.2 billion UAH) was established by a separate Resolution **No. 902 of August 22, 2023.** In late December 2023, the implementation period of the ""experimental" project" was first extended until the end of 2024 (**CMU Resolution No. 1411**), and subsequently increased its funding by an additional 8.4 billion UAH (**CMU Resolutions No. 327 of March 22, 2024**, and **No. 1060 of September 10, 2024**). Finally, **on November 22, 2024 (CMU Resolution No. 1333**), the construction completion deadline was postponed a second time, this time to June 6, 2025. The project also included the construction of a pipeline to discharge mine water from the storage facility in the Svistunova ravine in Dnipropetrovsk Oblast, with an additional 250 million hryvnias allocated for this purpose. These projects were indeed a timely and creative solution that helped kickstart the economic recovery and restore the lives of people without water supply from the Kakhovka HPP. Thus, these projects essentially align with the "Future Without the Kakhovka Reservoir" scenario and provide funding for an environmentally friendly model of regional development that is independent of large-scale hydropower.

In 2025, funding for these projects continued. CMU Resolution No. 1073 of September 3, 2025, "On the Implementation of an "experimental" Project for the New Construction, Reconstruction, Major Repair, and Technical Modernization of Water Supply Structures, Systems, and Networks in Populated Areas," supplements the Order of the Cabinet of Ministers of Ukraine No. 884 of September 17, 2024, No. 884 "On the Approval of the State Target Program for Comprehensive Water Supply to Territories Affected by Military Actions for the Period until 2030" a complex of new hydraulic structures (water intakes from the Southern Bug River and water mains in the Mykolaiv region).

Following several amendments (Resolution No. 922, Resolution No. 453, Resolution No. 412, Resolution No. 135), the final wording of the expenditure items was determined in accordance with Resolution of the Cabinet of Ministers of Ukraine No. 1619 of December 10, 2025, "On Amendments to Certain Resolutions of the Cabinet of Ministers of Ukraine Regarding the Construction of Water Supply Systems and Networks for Populated Areas", Funds allocated for new construction projects: "New construction of the Ingulets River–Pivdenne Reservoir main water pipeline to supply water to the city of Kryvyi Rih in connection with the need to eliminate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Dnipropetrovsk Oblast," "New construction of the Marganets–Nikopol - Pokrov in connection with the need to eliminate the negative consequences associated with the destruction of the Kakhovka hydroelectric power plant, Dnipropetrovsk region," and "New construction of a pipeline for the discharge of mine water from the Svistunova ravine in connection with the need to eliminate the negative consequences associated with the destruction of the Kakhovka hydroelectric power plant, Dnipropetrovsk region," which are used in accordance with the Procedure for the Use of Funds from the Fund for the Elimination of the Consequences of Armed Aggression (CMU Resolution No. 118 of February 10, 2023), taking into account the Procedure for the implementation of an "experimental" project regarding new construction, reconstruction, major repairs, and technical modernization of water supply facilities, systems, and networks in populated areas (CMU Resolution No. 1073 of September 3, 2025), the following amounts have been allocated:

Name of the facility and its location	Amount of funding from the state budget, thousand hryvnias	Total, thousand hryvnias
Dnipropetrovsk Oblast		
New construction of the Ingulets River–Pivdenne Reservoir main water pipeline to supply water to the city of Kryvyi Rih in connection with the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Dnipropetrovsk Oblast	322 276,193	322 276,193
New construction of the Marganets–Nikopol–Pokrov main water pipeline in connection with the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Dnipropetrovsk Oblast	213,807	213,807
New construction of the Khortytsia (DVS2) – Tomakivka – Marganets main water pipeline due to the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Zaporizhzhia and Dnipropetrovsk regions		
New construction of a pipeline for the discharge of mine water from the Svistunova ravine due to the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Dnipropetrovsk Oblast	177 510	177 510
New construction of a main water supply pipeline, a pumping and filtration station, and distribution networks in the village of Tomakivka, Nikopol District, Dnipropetrovsk Oblast		
New construction of a main water supply pipeline, a pumping and filtration station, and distribution networks for the Myrivska rural territorial community, Nikopol District, Dnipropetrovsk Oblast		
Total for this section	**500 000**	**500 000**
Mykolaiv Oblast		
New construction of a water intake from the Southern Bug River (Nova Odesa, Mykolaiv Oblast) and a main water pipeline to supply water to Mykolaiv in connection with the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Mykolaiv Oblast, Section I	3 035 044	3 035 044
New construction of a water intake from the Southern Bug River (Nova Odesa, Mykolaiv Oblast) and a main water pipeline to supply water to the city of Mykolaiv in connection with the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Mykolaiv Oblast, Section II	1 613 935	1 613 935
New construction of a water intake from the Southern Bug River (Nova Odesa, Mykolaiv Oblast) and a main water pipeline to supply water to the city of Mykolaiv in connection with the need to mitigate the negative consequences associated with the destruction of the Kakhovka Hydroelectric Power Plant, Mykolaiv Oblast, Section III	3 351 021	3 351 021
Total for this section	**8 000 000**	**8 000 000**

Thus, as of 2025, funding has shifted entirely toward restoring the water supply in southern Ukraine to accommodate the new conditions "without the Kakhovka Reservoir." Specifically, 500 million UAH has been allocated for the construction of water pipelines in the Dnipropetrovsk region (continuation of work from 2023–2024) and 8 billion UAH for the creation of new water intakes from the Southern Bug River in the Mykolaiv region.

Decision on funding projects to rebuild the Kakhovka HPP

From the day following the collapse of the Kakhovka Hydroelectric Power Station dam until the end of 2024, the state actively positioned itself as ready for its full restoration and even an increase in capacity. Among other things, funds were allocated from the state budget for the design of such a restoration. It should be understood that any potential "reconstruction" of the Kakhovka HPP would not involve mere repairs but a full-scale project to build a new HPP (according to official statements, twice as powerful as the destroyed one) and refill the reservoir. Given the natural processes of ecosystem restoration in the area of the former reservoir, as well as the challenges of demining the current landscape — now overgrown with young forest — any "reconstruction" without large-scale destruction of natural ecosystems is now impossible. Furthermore, the reconstruction of the hydroelectric power plant is impossible due to objective political and technical reasons:

- the left bank of the Dnipro is occupied by Russian troops;
- the area around the former reservoir and its former bed, now overgrown with forest, is extensively mined, and demining in dense forest is technically impossible;
- In the past, to build the Kakhovka HPP, the Dnipro's riverbed was diverted to the side, and later, on the territory where the riverbed had been temporarily diverted, parts of the hydroelectric complex and the entire city of Nova Kakhovka were built. Therefore, there is currently no possibility of diverting the river channel to the side, as the city is now located there.

However, in parallel with new water pipelines, Cabinet of Ministers Resolution **No. 730 of July 18, 2023**, launched another ""experimental" project" titled "*Construction of the Kakhovka Hydropower Complex on the Dnipro River: Reconstruction Following the Destruction of the Kakhovka HPP and Ensuring the Stable Operation of the Dnipro HPP During the Reconstruction Period*". This Resolution takes a clear stance regarding the future scenarios for the former Kakhovka Reservoir and HPP. Since this resolution remains in effect to this day, it should be interpreted as Ukraine's official position on the Kakhovka HPP: the state adheres to the scenario of "reconstruction" of the HPP and refilling of the reservoir. According to many experts, the implementation of such a project is not only environmentally and economically unfeasible but also physically impossible.

This project was to include sequential steps for the design and reconstruction of the Kakhovka hydroelectric complex, as well *as the construction of a retaining structure (counter-regulator dam) in the lower reach of the Dnipro HPP*, which would enable the use of the Dnipro HPP dam as regulating capacity during periods of peak load on the power grid while construction is underway. The resolution provides for two phases of work lasting two years, funded by PJSC "Ukrhydroenergo." No designs for such *a retaining structure* have been made public, and construction has not yet begun. It can be assumed that the structure in question refers to a new dam (or two) in the vicinity of Khortytsia Island. It would create a small reservoir to mitigate the destructive effects of water releases from the Dnipro HPP during peak load hours.

In June 2025, Oleg Pashchenko, director of the Kakhovka HPP, stated in an interview that the design of the counter-regulator had been completed, but said nothing about its construction. This may be due to the risks of gathering people and equipment while constructing a small dam in relative proximity to the front line, but more likely reflects the low priority of such a project for Ukrhydroenergo itself. In 2025–2026, the company is more interested in restoring the capacity of the Dnipro HPP itself — which has repeatedly suffered significant damage as a result of Russian shelling — than in creating a temporary counter-regulator. Once peace is restored, the company's primary focus will be on the rapid construction of the new Kakhovka HPP, as outlined in its strategic plan for 2023–2027. Specifically, the interview noted that *"The project will be implemented in two phases. The first is the design and construction of a retaining structure in the lower reach of the Dnipro HPP. This stage*

has already been completed on paper. The second will begin after de-occupation and demining. Then we will be able to assess the technical condition of the Kakhovka HPP structures, carry out dismantling, and develop a detailed reconstruction project. "Until the survey is conducted, it is impossible to provide any precise financial figures."

Just one month after the adoption of Resolution **No. 730**, in August 2023, PJSC "Ukrhydroenergo" signed an agreement with PJSC "Ukrhydroproekt" for preparatory work worth 123.81 million hryvnias. Approximately four months were allocated for calculating the construction cost and estimating the project timeline (completion date: December 31, 2023). Just two months later, the developers presented the completed project, estimating the cost of building the HPP at 8.98 billion UAH, with a construction period of eight years divided into three phases. The adoption of Resolution No. 730 facilitated the allocation of funding for design work from the state budget; however, the project's implementation would have to proceed after completing the EIA procedure. This, in turn, will only be possible after the region is de-occupied and martial law is lifted (without this, it is not even possible to conduct the studies required by the procedure).

As of the end of 2025, there had been no publicly announced updates on the status of the "experimental" project to rebuild the Kakhovka HPP. However, in 2024, the Cabinet of Ministers of Ukraine approved a new project of a similar nature, which is effectively a two-year extension of the old one (Resolution **No. 1483 of December 24, 2024**). This time, the plan calls for the reconstruction not only of the Kakhovka hydroelectric complex but also the restoration of other damaged facilities in the hydropower and fuel-energy sectors. The latest resolution supporting the "experimental" construction project has further sim-

To date, no amendments have yet been adopted to the legislation that would allow the EIA procedure to be bypassed for the Kakhovka Hydroelectric Power Station (amendments to the relevant law have not been introduced). It was only in May 2024 that the former Ministry of the Environment held a public consultation on a document intended to introduce such amendments4. However, shortly afterwards, the ministry itself was dissolved and this document was not considered further. Yet, for some reason, the "pilot project" had already received funding, which continued in the years following 2023.

Most of the projects related to the Kakhovka issue that were planned and funded for 2023–2024 did not undergo the Environmental Impact Assessment (EIA) procedure. These measures fell under those aimed at mitigating the consequences of emergencies and the Russian Federation's military aggression against Ukraine. Although all these projects are essentially new construction rather than "restoration" or "mitigation of consequences," their implementation does not require an Environmental Impact Assessment (EIA) during martial law (exceptions to the EIA procedure are specified in Resolution No. 1010 of the Cabinet of Ministers of Ukraine dated December 13, 2017).

Rapid construction is carried out without proper assessment or consideration of alternatives. As a result, this leads to the destruction of valuable natural areas and even cultural heritage sites, or causes other problems, for the resolution of which new projects are approved that also bypass the environmental impact assessment procedure.

The construction of a pipeline to discharge mine water from the storage pond in the Svistunova ravine (Kryvyi Rih district) may serve as an example of a project that is in no way related to the consequences of the destruction of the Kakhovka HPP, yet was approved as a project to mitigate the consequences of the explosion. The new water intake for the city of Kryvyi Rih is located downstream of the point where the contents of the storage pond are discharged. This discharge water has a high mineral content, which could negatively affect the quality of drinking water. Meanwhile, for example, another similar project to construct a pipeline for discharging mine water in the same region, but on the opposite bank of the Dnipro (in Pavlohrad District), is undergoing an EIA procedure (Case No. 10499).

plified the approval procedure for hydroelectric power plant restoration and construction projects. Now it can be carried out without complying with many of the approvals required in such cases (however, the resolution does not mention the EIA procedure). It is also interesting that the text of the Procedure states that *"The provisions of this Procedure do not apply to territories and objects of the nature reserve fund."* However, within the territory of the former Kakhovka Reservoir, there are several nature conservation areas (including the "Kam'yanska Sich" and "Velykyi Lug" national nature parks), which will undoubtedly be affected by the "restoration" of the reservoir. In 2025, there were no updates to the text of this Resolution, nor was funding extended.

"Experimental" projects generally require a more detailed assessment than those based on existing analogous facilities, whose impacts are generally known. Exempting "experimental construction" from standard impact assessment procedures with adequate public participation directly contradicts the "precautionary principle" enshrined in environmental treaties, conventions, and the policies of international development banks.

Thus, as of the end of 2024, the Ukrainian government was simultaneously allocating funds both for the construction of water pipelines (which are effectively an adaptation of the region to life without a reservoir) and for the design of a new hydroelectric power plant. If a new reservoir is indeed built in the future, the water pipelines will become obsolete (even though they account for the largest share of funding, totaling approximately 16.9 billion hryvnias as of the end of 2024).

It can be asserted that Ukraine has not abandoned its plans to build the new Kakhovka HPP, since, for example, according to the Order of the Cabinet of Ministers of Ukraine **No. 988-r** of **September 15, 2025**, "On Amendments to the Order of the Cabinet of Ministers of Ukraine No. 590 of June 30, 2023," the Ministry of Culture and Strategic Communications, in coordination with the cultural heritage protection agencies of the Zaporizhzhia, Kherson, Mykolaiv, and Dnipropetrovsk regional military administrations, shall ensure the implementation of measures necessary to protect cultural heritage and cultural assets in the territories affected by the destruction of the Kakhovka Hydroelectric Power Plant, until the completion of the "experimental" project "Construction of the Kakhovka Hydroelectric Complex on the Dnipro River. Reconstruction following the destruction of the Kakhovka HPP and ensuring the stable operation of the Dnipro HPP during the reconstruction period" in accordance with Resolution No. 730 of the Cabinet of Ministers of Ukraine dated July 18, 2023.

Restrictions on the use of land under the former Kakhovka Reservoir

Another area of activity for central government agencies has been the introduction of restrictions on the use of land under the former reservoir. Until the dam's destruction, the reservoir was classified as a water body of national importance, with its operating regime determined by the State Water Agency. However, its boundaries had not been marked on the ground, and the land plots had not been registered for anyone's use.

Following the collapse of the hydroelectric power plant's dam, in accordance with the Land Code of Ukraine (Paragraph 24 of the Transitional Provisions), the territory under the reservoir became communal property of the 36 surrounding communities. At the same time, they gained the ability to transfer these lands to private ownership or even implement the right of restitution. This would create significant obstacles to the potential construction of a new reservoir.

To prevent local communities from making spontaneous decisions, the Cabinet of Ministers of Ukraine submitted Draft Law of Ukraine No. 10135 "On Amendments to Certain Legislative Acts of Ukraine Regarding the Creation of Conditions for the Restoration of the Kakhovka Reservoir" as early as October 2023. In January 2024, members of the Verkhovna Rada's Agrarian Committee submitted an alternative bill to the government's, No. 11035-d. It not only imposes a moratorium on the use of land under the reservoir (except for the purpose of restoring the hydroelectric complex) but also allows for the creation of nature reserve areas on that land. After registering Bill No. 10135-d, members of the Agricultural Committee definitively rejected the government's bill and retained their own as the primary version for further consideration. As of the end of 2024, this law had not been adopted.

Since the Cabinet of Ministers of Ukraine did not receive support from Parliament, it independently adopted the Resolution "On Preventing the Misuse of Lands Occupied by the Kakhovka Reservoir"

(**Resolution No. 286** of March 12, 2024). It prohibited the transfer of ownership or use and the change of designated purpose of lands under the Kakhovka Reservoir *for the duration of martial law and for five years following its termination. The only exception was changes necessary for the restoration of the Kakhovka Reservoir and the construction of hydraulic structures*. It is therefore evident that this resolution was adopted exclusively in the interests of the reservoir's construction. To prevent the privatization of land under the reservoir by hromadas (self-governing local communities) legislators introduced amendments to the Land Code of Ukraine (Article 24-1 of the Transitional Provisions). According to these amendments, as of October 8, 2024, the territory of the former Kakhovka Reservoir is state property. To date, no changes have been made to the Resolution.

Thus, the Cabinet of Ministers of Ukraine chose to adapt the legislation to the needs of the "creation of a new reservoir" scenario.

Later, in 2025, amendments were made to Resolution 286 (**Resolution No. 394 of April 8, 2025**), which allowed for the registration of land plots on which houses had already been built along the shores of the former reservoir.

It is interesting to note that during the period following the destruction of the Kakhovka HPP and the damage caused by rocket attacks on other HPPs, not a single legislative or regulatory act regarding any HPP other than Kakhovka — the legislation for which we reviewed above — was added to the government portal.

New policy documents

It is also worth mentioning strategic documents that either selectively mention or completely omit the topic of the Dnipro River cascade.

Potentially, the most interesting document for analysis should be Ukraine's Energy Strategy until 2050, which was approved **by Resolution of the Cabinet of Ministers of Ukraine No. 373-r dated April 21, 2023**. However, due to wartime restrictions, the strategy itself has not been made publicly available and is not accessible for analysis. The text of the action plan for this Strategy, which was published as part of the Strategic Environmental Assessment procedure, lists a series of small HPP cascades, a number of new pumped-storage hydropower plants, and a declarative measure titled "State incentives for investment in the further construction and modernization/reconstruction of the hydropower sector, including small hydropower," but there is no mention of the Dnipro cascade. However, following the damage to a number of HPP structures and the complete destruction of the Kakhovka HPP, no new amendments were made to the Strategy.

Thus, **the Resolution of the Cabinet of Ministers of Ukraine No. 1271 of November 19, 2025** "On the Approval of the Concept of the State Targeted Social Program for Improving Drinking Water Supply in Ukraine for the Period until 2035" provides for the construction of a water supply network for all settlements in Ukraine by 2035, and this Concept makes no mention of the restoration of the Kakhovka Reservoir.

Of particular importance is the intention outlined in **the CMU Order of March 25, 2025, No. 280-r** "On the Approval of the Long-Term Development Plan for Ukraine's Irrigation Complex until 2050." The document very one-sidedly and biasedly insists on the only possible way of conducting agriculture in Ukraine — irrigation — rejecting other production technologies and even the possibility of using crops that do not require irrigation. The document is undoubtedly a lobbying effort and does not align with modern concepts of climate change adaptation. For example, the document states that *"by 2050, about half of Ukraine's arable land will be unsuitable for agriculture without irrigation"* and even envisions the possibility of diverting water from the Danube River for irrigation! The document explicitly mentions the need to attract partner funding for the reconstruction and development of the irrigation system:

"In addition, the destruction of the Kakhovka Reservoir dam by Russian troops has left 94 percent of irrigation systems in the Kherson region, 74 percent in the Zaporizhzhia region, and 30 percent in the Dnipropetrovsk region without a water source for an extended period."

Water from the Kakhovka Reservoir was used to irrigate significant areas of arable land. Due to a number of natural and anthropogenic factors, the water from this reservoir was the saltiest and most polluted among the reservoirs in the cascade, with a mineralization index of 253–433 mg/L. According to research data from the Kakhovka Reservoir area, the average air temperature during the growing season rose from 15.9°C in 1938 to 20.5°C in 2018. This has led to increased evaporation, which in turn has led to increased water salinity. Significant volumes of water also evaporated during transport through the canal network, as well as directly during irrigation by sprinkler systems, which literally spray water into the air (including on hot days). The highest evaporation rates occurred during the period of most intensive water abstraction into the main canals.

In EU countries, an average of 2,500–3,000 m^3 of water per hectare per year is used for crop irrigation, with usage standards regulated depending on the crop, whereas in Ukraine this figure is often not standardized (for example, for grain crops in the EU, approximately 500–800 m^3/ha is allocated, in Ukraine it may exceed 1,000 m^3/ha). Thus, the prolonged use of water with elevated or threshold salinity levels for irrigation contributes to the gradual accumulation of salts in the soil.

Highly mineralized waters from steppe rivers also flowed into the Kakhovka Reservoir[1] . The dissolved salt content in the Oril, Ingulets, and Mokra Moskovka rivers exceeds 1,000 mg/L, which is the maximum permissible concentration for drinking water supply according to DSanPiN 2.2.4-171.10, and thus generally excessive.

Furthermore, the soils of Ukraine's southern regions are prone to secondary salinization. The aquifers on the border of the Kherson and Zaporizhzhia regions consist of rocks with high natural salinity, as this area was historically a seabed. The highest concentration of easily soluble salts is observed at depths of up to 2 m, so the shallow depth of saline groundwater (primarily in the Kherson region) leads to secondary salinization when irrigated with any water. The resulting saline solution spreads throughout the entire moistened layer of the earth's surface. **As a result, the entire irrigated area gradually becomes unsuitable for cultivation**.

Thus, water from the Kakhovka Reservoir was the least suitable for irrigation among all major reservoirs in Ukraine and was classified as Class II — "limited suitability." The use of such water requires special soil flushing measures, which were never implemented here, and within the irrigation systems, drainage structures were not even constructed.

1 Shakirzanova, Zh. R., & Kichuk, N. S. Hydrochemistry of Rivers and Water Bodies in Ukraine: Lecture Notes. Odessa, 2015. p. 15.

The Plan was prepared without any understanding of the concept of sustainable development, as it explicitly states that irrigating the entire south of Ukraine constitutes sustainable development and even the preservation of biodiversity! Meanwhile, the document considers the development of irrigation both with and without the reconstruction of the Kakhovka HPP: *"By 2050, the implementation of the long-term plan will make it possible to increase the area of irrigated agricultural land to 700–750 thousand hectares (the area of agricultural land which can be irrigated by 2050 will be specified based on the results of an inventory of land reclamation systems), and provided that the Kakhovka HPP is rebuilt and additional stored water volume is created, as well as the liberation of the temporarily occupied territories of Ukraine, including the Autonomous Republic of Crimea, a further increase in irrigated areas can be considered."*

At the same time, an important question is whether it is at all economically and environmentally feasible to continue irrigating arable land in southern Ukraine, since this technology leads to soil salinization.

Unfortunately, only a few Ukrainian documents explicitly state that soil salinization in the south is caused by irrigation, although the assertion that "Use of highly mineralized irrigation water

can cause severe soil salinization" is an obvious truth in FAO documents, including specific statements regarding Ukraine: "Ukraine, irrigation with brackish water is the cause of soil salinization." And although it is evident that soil salinization is a typical consequence of irrigation, especially when using mineralized water and in the absence of drainage, there were no national programs at that time to reduce the volume of irrigation or completely abandon it; on the contrary, Ukrainian government documents point to a long-term perspective for the development of irrigation.

Rapid Damage and Needs Assessment (RDNA) and the "Legacy" of the Kakhovka HPP

The annual Rapid Damage and Needs Assessment (RDNA), conducted under the auspices of the World Bank, is the most comprehensive document on reconstruction needs and explicitly includes the restoration of the Kakhovka HPP. The latest RDNA5, released in February 2026, is a 60-page summary of the findings of previous reports, but it still includes a section dedicated to the agricultural irrigation and water supply sector. It calls for the restoration of protective hydraulic structures along the Dnipro reservoirs, as well as the modernization and expansion of irrigation systems. Total needs for restoration and reconstruction are estimated at $12.5 billion for the ten-year period 2026–2035. The main concentration of needs is in the following regions: Kherson Oblast (US$1.8 billion), Mykolaiv Oblast (US$0.6 billion), Odesa Oblast (US$0.4 billion), Kharkiv Oblast (US$0.3 billion), and Luhansk Oblast (US$0.3 billion) (RDNA5, pp. 33–34).

This information is largely drawn from the more detailed RDNA4 report published in February 2025. In this report, *"priority is given to areas with existing water shortages, particularly regions affected by the destruction of the Kakhovka Dam, as well as those at risk of future droughts due to climate change. The Kherson region has the greatest investment needs — approximately $1.85 billion; this includes large-scale repairs to the Kakhovka Dam and pumping station to restore irrigation across 780,000 hectares"* (RDNA4, p. 123). Table 20 on p. 125 specifically allocates $1.5 billion for "water storage projects," which primarily refers to reservoirs.

Thus, the most authoritative estimates of reconstruction needs to date still include budget allocations for the restoration of the Kakhovka Dam as a water supply facility for irrigation.

Interestingly, the RDNA reports devote very little attention to hydropower: specifically, in RDNA4, it is mentioned primarily in connection with the need to remove restrictions on private investment. The report does not provide separate quantitative estimates of needs specifically in the hydropower sector. For a more detailed overview of RDNA-5, see UWEC materials.

Environmental Compact for Ukraine

An important international policy guideline for Ukraine's post-war recovery is the Environmental Compact for Ukraine — a document prepared by the High-Level International Working Group on the Environmental Impacts of War, established at the initiative of the Office of the President of Ukraine. The document contains about 50 recommendations for Ukraine and the international community regarding the assessment of the war's environmental damage, holding the aggressor state accountable, and ensuring the country's "green" recovery. The Compact proposes integrating environmental standards into all post-war reconstruction processes, including energy, infrastructure, and natural resource management. In the context of the Lower Dnipro, this means that decisions regarding the future of the former Kakhovka Reservoir must be made in accordance with the principles of environmentally responsible restoration and the long-term preservation of natural ecosystems. In accordance with the approaches outlined in the Environmental Compact, infrastructure reconstruction should not replicate environmentally outdated models of natural resource management. Therefore, the restoration of the Velykyi Luh natural river-floodplain complex can be viewed as an example of "green restoration," whereas the re-creation of a large reservoir requires a thorough assessment of its compliance with the principles of environmental sustainability and Ukraine's international environmental obligations.

The document embodies the important values of trust, democratic ideals, and the prioritization of environmental issues. Among the issues that serve as cross-cutting themes of the Environ-

mental Compact and apply to all recommendations is the concept of "Planetary Boundaries." The European Nature Restoration Law was developed based on this concept, and for Ukraine, this concept represents a completely new approach.

The issue of the Kakhovka HPP is given special attention in the agreement, as it clearly states that the potential reconstruction of the Kakhovka HPP is an example of a project requiring a transparent assessment involving independent experts.

The development of an Action Plan for the implementation of the recommendations of the Environmental Compact for Ukraine (hereinafter — the Action Plan) is a timely step following the publication of the Environmental Agreement for Ukraine.

In 2024, Ukraine's Ministry of Ecology developed a Plan intended to facilitate the implementation of the Environmental Agreement for Ukraine. However, this Plan was criticized by civil society organizations. In some cases, the planned measures directly contradict the recommendations. This is most clearly evident in the context of the Kakhovka HPP. Recommendation 42 of the Environmental Compact mandates EIA and SEA for all projects, plans, and programs. Yet the measure outlined in the Action Plan calls for developing mechanisms to waive EIA and SEA requirements. Furthermore, the Environmental Agreement clearly states that the potential reconstruction of the Kakhovka HPP is an example of a project requiring a transparent assessment involving independent experts. Yet the Plan explicitly states that the potential reconstruction of the Kakhovka HPP should be designed without undergoing the EIA procedure.

Here are some examples regarding the Kakhovka HPP from this "Plan"

Environmental Compact for Ukraine	Action Plan
Recommendation 27. *Consider allowing certain developed areas to return to their natural state, as well as conducting broad consultations and involving experts in the decision-making process* In some cases, the best environmental policy is to allow certain developed areas to return to their natural state. This approach is attracting interest in Europe and around the world. If this is proposed, Ukraine must commit to conducting broad consultations and involving experts in the decision-making process to balance the needs of the economy and society with the goals of restoring green spaces and achieving climate objectives. A. The future of the Kakhovka Dam is one example that continues to be discussed in the media, by scientists, and by civil society experts. The government has previously stated its intention to restore the dam. Meanwhile, interesting compromise proposals have been developed that deserve attention, such as building a dam on a smaller scale. It is recommended to engage independent experts to thoroughly analyze the options and their associated environmental impacts, given the significant scale of this project and its long-term and multifaceted consequences.	**Proposed measure:** engage experts, representatives of the public and the scientific community, and conduct consultations to determine the criteria for restoring certain developed areas to their natural state, compile a preliminary list of areas that can be restored to their natural state, and implement measures for the conservation and reclamation of disturbed lands
Comment: The task does not correspond to the wording in the Environmental Compact, as this recommendation clearly refers to the case of restoring natural ecosystems following the destruction of the Kakhovka Dam, specifically stating "to engage independent experts for a thorough analysis of options and their associated environmental impacts, given the significant scale of this project and its long-term and multifaceted consequences." It is necessary to add a specific provision regarding the involvement of independent experts in studying the restoration of natural ecosystems within the territory of the former Kakhovka Reservoir	

Environmental Compact for Ukraine	Action Plan
Recommendation 42. *Clear protective measures must be in place to prevent significant harm to the environment during reconstruction; EIA and SEA must be mandatory for all projects, plans, and programs, regardless of whether they involve post-war reconstruction or normal development, with proper oversight to ensure their implementation* Clear protective measures must be put in place to ensure that reconstruction activities do not cause significant harm to the environment. Environmental impact assessments and strategic environmental assessments must be mandatory for all projects, plans, and programs, regardless of whether they involve post-war reconstruction or normal development, with adequate oversight to ensure their implementation. A. Ukraine should review its legislation and any exceptions in effect during wartime and make the necessary amendments to ensure that all construction or reconstruction projects undergo an environmental impact assessment, as well as compliance with EU directives on environmental impact assessment and strategic environmental assessment.	**Proposed measure:** Prepare a Concept Note on the application of exemptions in the strategic environmental assessment and environmental impact assessment procedures, which should identify the competent authority and the decision-making mechanism, as well as the duration of validity.
Comment: The draft concept note contradicts the objectives of Recommendation 42, as it states that projects related to the Kakhovka Reservoir must be excluded from such an assessment, even though the Environmental Compact contains a separate recommendation emphasizing the need for a particularly thorough expert review of the Kakhovka HPP involving independent experts.	

Thus, even such a powerful safeguard as an international public document posted on the President of Ukraine's web portal casts doubt on the Ukrainian state's intentions to address the issue of the Kakhovka HPP's destruction through the lens of environmental standards (including the legal restrictions of the laws on EIA and SEA). However, it must be acknowledged that the Plan for implementation of the Environmental Compact has not been officially approved for over a year (although the draft of the relevant resolution and the plan itself were published for public discussion), and therefore it is unlikely to proceed in its current form.

International finance and support to water-energy infrastructure in Ukraine during the war

Scale and channels of hydropower finance in support schemes

In the decades before this war, international development banks considered supporting the creation of new hydropower stations and hydroelectric and pumped storage power plants using Soviet-era designs on the Dniester, Southern Bug, and Dnipro rivers. Each of these projects raised concerns among scientists, as well as protests from the environmental community and local residents. Well-known international organizations such as CEE Bankwatch Network were involved in risk analysis and even produced documentaries to inform the local population about the risks. As a result, none of the proposed new hydropower stations were implemented with funding from cautious international banks.

At the same time, banks are willing to provide Ukraine with money for the modernization of aging Soviet-era hydropower plants, facilities that require regular renovation and replacement of key equipment. Modernization of a single large hydropower plant often requires a loan of USD 100 million or greater, and a return on the investment is reliably guaranteed by the sale of the electricity produced. Unlike dispersed wind and solar power plants, large hydropower facilities are convenient for providing large loans, and as a result, bank staff prefer to support these sorts of "no sweat" projects. Large state-owned Ukrhydroenergo boasts 185% growth in income

Consequently Ukrhydroenergo regularly received loans to renovate Soviet dams, but, unfortunately, these projects rarely included the task of reducing the environmental damage they routinely caused. In the EU, and even more so in the United States, reducing "chronic" environmental impacts in accordance with present-day legislation is a mandatory requirement not only for large modernization projects, but even simply for renewing the license to operate hydropower plants. After all, some dams have been in service for centuries and were created at a time when there were no environmental requirements for them whatsoever.

Since January 2023, international financial assistance for Ukrainian hydropower has focused exclusively on the state-owned operator Ukrhydroenergo (UHE). Funding priorities have shifted toward emergency repairs, equipment procurement, and wartime resilience for the Dnipro River cascade following Russian missile strikes and the 2023 destruction of the Kakhovka HPP. Taken together loans and grants for hydropower rehabilitation and upgrade issued since 2021, likely, exceed USD 800 million (not counting project co-financing from UHE itself).

No international funding has been committed (publicly announced) for large-scale new dam construction or the formal reconstruction of Kakhovka HPP, which remains in the planning phase. Current support is characterized by sovereign-guaranteed loans and grants from the World Bank, EBRD, and EIB, often backed by EU guarantees.

Institutional Financing & Key Projects

World Bank (WB)

The World Bank combines strategic planning (e.g., the Rapid Damage and Needs Assessment – RDNA) with project-specific lending.

- **Power System Resilience Project**: according to 2021 initiative (**US$212 million**), Ukrhydroenergo planned to install hybrid systems combining high-speed storage (batteries) of electricity with a capacity of 212 MW and solar panels with a capacity of 63.9 MW on the sites of five branches Kyiv HPP and PSP Cascade, Kaniv HPP, Kremenchuk HPP, Seredniodniprovska HPP and Dnister HPP and PSP Cascade (See "Improving Power System Resilience for European Power Grid Integration"). The 2021 project was based on the assumption that Ukraine's energy system and hydropower stations themselves are not sufficiently flexible and their safe integration with the EU network will be facilitated by integrating hydropower plants with batteries and small solar power plants for short-term energy storage. The project was repurposed in 2024–2025 by adding an emergency fund (**Contingent Emergency Response Component (CERC)**) **of USD 148 million** for war damage restoration. In 2023-25 this money was partially used to purchase equipment (transformers) for Kyiv, Kremenchuk, Kaniv, Dniester HPP, while the rest is earmarked for turbines and generators for Dnipro-2 and Dniester Pumped Storage plants (data from December 2025 report)

- **2025 Additional Financing (US$70 million)**: Signed in April 2025 to install hybrid systems (Solar PV + Battery Storage) at four UHE facilities. This is intended to improve ancillary services and grid stability. (See Ukraine - Improving Power System Resilience for European Power Grid Integration Project : Additional Financing (English))

- **Domestic Manufacturing**: In February 2026, UHE utilized WB funds to contract Ukrainian Energy Machines for turbines and hybrid systems, prioritizing the domestic wartime economy.

European Bank for Reconstruction and Development (EBRD)

The EBRD provides systemic support for the Dnipro cascade, focusing on "Green Energy Transition" and operational resilience.

- **2024 Loan Package (€200 million)**: Includes a €100 million EBRD loan and a €100 million concessional loan from Italy. Funds for restoring stable electricity production, support energy system balancing, and renewable integration during the war targeted the replacement of four units at Dnipro HPP and maintenance equipment for Seredniodnipro HPP. EBRD noted this as part of €4+ billion total Ukraine deployment since 2022.

- **2026 Modernization Project (€120 million total)**: Comprises a €75 million EBRD loan (backed by the EU's Ukraine Investment Framework) and €20 million in international grants. It covers emergency stockpiles and equipment (generators/turbines) for **Kyiv HPP** and **Dnipro HPP-2**, aiming to restore ~223 GWh of annual "green" electricity.

European Investment Bank (EIB) & EU

EIB funding is largely channeled through the "Ukraine Facility" and the "Solidarity with Ukraine" package.

- **2023 Tranche (€133 million)**: Disbursed as additional funding with EU guarantee backing to a repurposed 2012 framework **project "Rehabilitation of Hydropower Plants"** for hydropower repairs to 21 hydro units across the Dnipro cascade, including Dnipro-1 and Dnipro-2 (partially destroyed); Kyiv PSHP; Kaniv; Kremenchuk; Serednyodniprovska. This tranche follows the amount of €67 million disbursed earlier under the same existing project which finance was fully used by mid-2022.

- **2025 Ukraine Facility Project (€120 million)**: A pioneer project under the EU's flagship recovery instrument, targeting urgent repairs at strategic sites (Dnipro, Kaniv and Kremenchuk HHPs) to restore energy resilience and ensure winter energy security amid ongoing attacks. This EIB (loan to Ukrhydroenergo) is part of a broader ~€600 million EU/EIB package for energy, transport, and resilience (backed by EU guarantees).

Are there any Strategic Partnerships and Future Proposals to restore Kakhovka Dam?

Kakhovka HPP/Dam (destroyed June 6, 2023): No international loans, grants, or direct investments for repair or reconstruction were identified post-2023. Ukrhydroenergo has developed post-war recovery plans (preparatory work, temporary dams, etc.), estimating 5–7 years for rebuilding and billions in costs (Ukrainian President Zelensky referenced ~€2 billion in one 2025 statement). Related international support has focused on humanitarian/water recovery (e.g., EU/IOM €30 million for Kryvyi Rih water systems in June 2025 due to the dam breach), not hydropower generation or dam rebuild. Broader RDNA assessments (World Bank/EU/UN, updated February 2026) estimate massive energy sector needs (~$91 billion total reconstruction) but do not earmark specific new hydro/dam funding.

Public documents relating to the Ukraine Facility frequently mention the Kakhovka Hydroelectric Power Station, although there is no information regarding funding for this project from the Ukraine Facility. For example, the "Plan for the Ukraine Facility" for 2024–2027 mentions "*an increase in generating capacity, namely: ... Restoration and reconstruction of damaged thermal power stations and hydroelectric power stations (including the Kaniv and Kakhovka HPPs)*... " and states that key investment needs for the period 2024–2027 include "the elimination of the negative consequences of the war through the clearance and restoration of damaged infrastructure and facilities in accordance with the principles of the 'better than before' reconstruction concept, focusing on sustainable practices. This includes demining and clearing agricultural land and the reconstruction of irrigation and drainage infrastructure, including the reconstruction of pipelines, pumping stations, on-farm infrastructure, as well as the restoration of vital structures such as the Kakhovka hydroelectric power station based on priorities determined by the results of a full economic benefits analysis".

Despite lack of direct evidence of any international financing, there are clear signs that Ukraine's leadership is active in arranging such support. For example on December 25, 2025 President Zelensky commenting on various drafts of the piece plan noted: "The "Russians" will not invest themselves. The only thing they need is drinking water in Crimea. I believe that the Americans will be able to quickly build a dam, due to which there will be water. But there will be water everywhere."

Therefore, it is important to monitor hydropower/energy/irrigation portfolio development at US and other bilateral institutions and involvement of US companies in the sector, such as **U.S.-Ukraine Reconstruction Investment Fund (URIF)** DFC-led facility, operational December 2025 with a public portal for submissions launched in January 2026.):

A bilateral investment vehicle (initial capitalization building toward ~$200 million) open to private-sector and project proposals in power generation, energy, and related infrastructure. First investments (target: three projects) expected by end-2026. Hydropower/dam repair is eligible under the "power generation" pillar, but no specific hydropower proposals or commitments have been publicly announced or approved as of March 2026.

Important lobbyists of such restoration in all donor countries are engineering, construction and equipment-manufacturing firms eyeing rebuilding of a large dam as a rare major business opportunity in Europe. And the government of their countries are eager to incorporate such deals in their support packages for Ukraine.

For example, half of a EUR 200 million loan is provided by the Italian government. It is likely that, among other objectives, such a contribution supports the participation of Italy's largest company **WeBuild (formerly Salini Impregilo)** in Ukrainian power hydropower sector. Ukrhydroenergo and WeBuild have already signed a memorandum of cooperation, which has been approved by the two governments, that is related to the "creation of new hydropower plants and conversion of hydropower stations into pumped storage power plants." Research by European scholars shows that WeBuild received low scores in corporate responsibility and was a key executor of many of the most odious hydroelectric long-term hydropower construction projects, including the Nenskra HPP in Georgia, Gibe-III HPP in Ethiopia, and the Rogun HPP in Tajikistan (see A.Bontempi et al. 2021). Webuild is a highly likely contractor for a large dam in fragile and controversial context.

Another example is the **AECOM deal** (announced June 12, 2024) when this US company has formalized a partnership with Ukrhydroenergo to support of the restoration and reconstruction of Ukraine's hydropower assets, systems, and capabilities. The deal was announced at the Ukraine Recovery Conference in Berlin.

Purpose: Help restore and reconstruct hydropower assets damaged in the conflict. AECOM's CEO highlighted support for Ukraine's critical infrastructure recovery, no further information found on the company's website.

Critical Challenges and Implementation Risks for International Finance Institutions (IFIs)

Corruption and Transparency

Hydropower is globally known as corruption-prone sector, partly due to unique complex features of each project evading standardization and stringent cost-estimates.

Despite international oversight, public procurement remains a high-risk area in Ukraine. A series of scandals has raised concerns about the possible misuse of funds earmarked for the restoration of hydropower capacity.

Corruption in state-owned companies is a major concern for the Government o Ukraine. For example, after stepping down of the former head of Ukrohydroenergo Ihor Sirota in early 2025, the announcement for search of new leader subjects candidates not only to comprehensive background screening, but also to a mandatory polygraph examination to identify risks related to potential cooperation with foreign intelligence services and corruption motives, conflicts of interest, dependency on third parties whose interests contradict those of the company or the state.

It is interesting to note that, just as international banks are providing funding for the reconstruction of the Dnipro Hydroelectric Power Station, public corruption scandals concerning the use of these funds are erupting. In particular, since the start of the full-scale war, there have already been several corruption scandals surrounding the use of funds within the "Ukrhydroenergo" system:

1. scandal concerning the award of a contract to a contractor linked to sanctioned individuals and suspected of having links to international money-laundering schemes, as part of the restoration of hydropower facilities (funding: state funds and international loans/reconstruction programmes) ($23 million, 2024–2025);

2. expenditure of around 198 million UAH solely for the design of protective structures for the Dnipro Hydroelectric Power Station, without any actual construction taking place, which has drawn criticism regarding the inefficient use of funds (funding: the Ukrainian state budget, presumably as part of energy infrastructure restoration programs) ($4.5 million in 2024);

3. scandal concerning the questionable allocation of 4.4 billion hryvnias for the protection of the Dnipro Hydroelectric Power Station's structures to a firm with experience in the reconstruction of tram tracks and landfill sites (funding: state funds and international loans/ reconstruction programmes) (2025).

Furthermore, the overall context of corruption risks in Ukraine's state-owned energy sector is well illustrated by the investigation into large-scale kickback schemes in major infrastructure contracts (Operation Midas) (funding sources: state-owned energy companies and related budgetary and tariff funds, 2023–2025).

Environmental and Legal Conflicts

Multilateral development banks and EU institutions have relatively stringent social and environmental standards, which have to be upheld when investing in recovery of Ukraine. However, in practice the international finance institutions readily postpone any due diligence and information disclosure till post-war period, while financing (re)construction of infrastructure capable to cause significant environmental harm.

- **EIA Waivers:** Under Martial Law, UHE and international banks have bypassed mandatory Environmental Impact Assessments (EIA). The EBRD has deferred full E&S audits until 12 months after Martial Law ends, creating a "compliance gap" where permanent infrastructure is built without modern environmental safeguards. Finally, in accordance with Resolution No. 730 of the Cabinet of Ministers of Ukraine dated 18 July 2023, the "experimental" project for the construction of the Kakhovka hydroelectric complex may proceed without an environmental impact assessment. Furthermore, martial law has resulted in a total moratorium on state environmental inspections, meaning no entity is monitoring whether businesses actually comply with environmental conditions.

- **Blocked public participation:** Recent civil society report on environmental assessments in wartime reveals that the environmental safeguards assumed by the international community are being actively bypassed or restricted on the ground due to martial law. NGOs note that public access to the environmental impact assessment registers has been heavily restricted since 2022 under the guise of national security. Documents are locked behind digital signatures, and the system prevents text searches or copying, which significantly limits public participation and independent analytical work.

- **Ecosystem Management:** Environmental flows are poorly defined in Ukrainian law and not consistently instituted below the lower dams of hydropower cascades on Dinpro, Dniester and other rivers.The on-going WB Project Paper (2025) mentions Dniester River Environmental Flow Assessment for the Dniester Pumped Storage Power Plant (PSPP), but explicitly request on that matter to the World Bank from the CSO (UWEC) was not answered by bank officials. Meanwhile there is no up to date ESIA or ESMP, which makes external monitoring impossible. The issues most acute in Lower Dnipro. Until 2023, the Kakhovka Reservoir significantly disrupted the natural flow regime in the lower reaches of the Dnieper, altering the suitability of ecosystems and the life cycles of many species. The destruction of the Kakhovka dam has radically transformed the Lower Dnieper, including the effective restoration of a 250 km stretch of the Dnieper

valley and the gradual re-establishment of the river's natural floodplain regime and its characteristic biodiversity. Environmental organisations argue that current modernisation projects upstream (primarily at the Dnipro HPP-1 and HPP-2) do not take into account the requirements for 'ecological flow' (water release) necessary to restore and maintain biodiversity downstream. The management of the cascade of reservoirs has not yet been reviewed and is approached by Ukrhydroenergo exclusively through methods that have been in place since the reservoirs were built in the 1930s and 1950s. In other words, the management of the cascade of reservoirs is carried out as if modern views on climate change, river basin management and, most importantly, as if the Kakhovka Reservoir still existed.

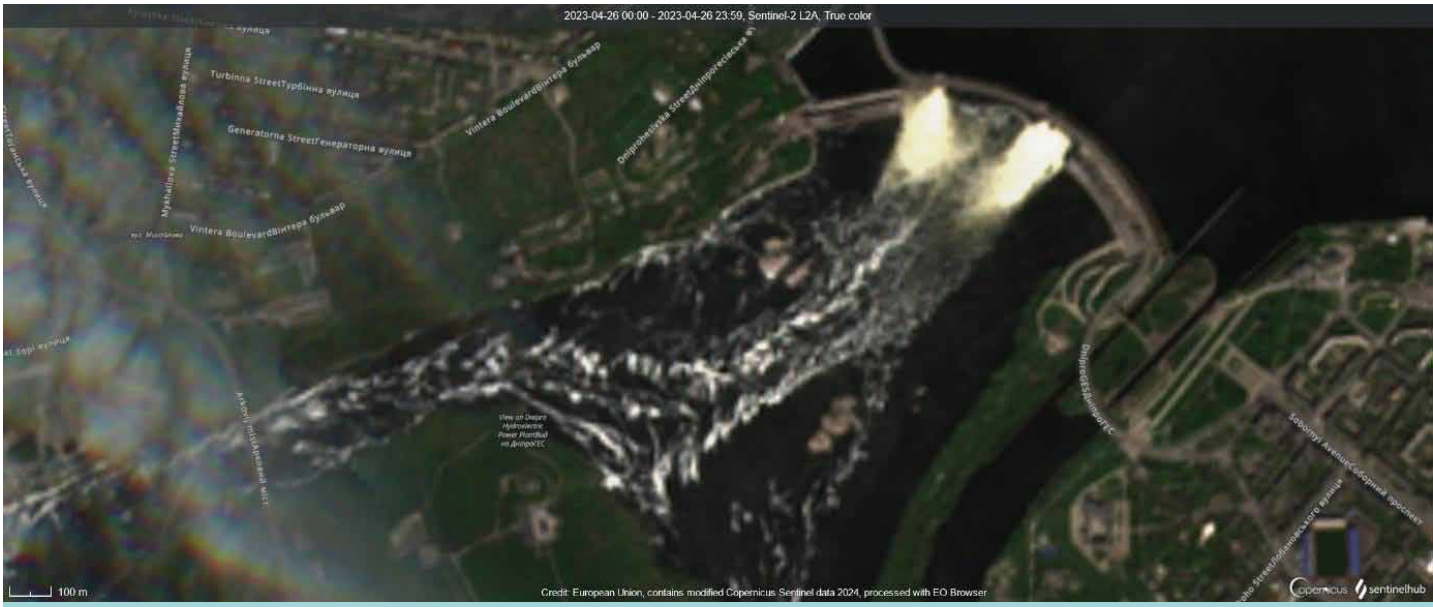
- **Hydro-peaking Impacts:** Without the Kakhovka Reservoir to level discharges, "hydro-peaking" (rapid water release for peak demand) from Dnipro HPP may cause severe erosion and compromise aquatic habitat integrity near the Khortytskyi Reserve. This made Ukrainian Government to order design and development of counter-regulator dam (described earlier in this document). However, that dam may be planned inside one or even two protected areas and also may conflict with integrity of newly restored spawning grounds of critically endangered Russian sturgeons, actively used by those fish in 2024-25.

Operational Barriers

As the recent review by International Energy Agency shows, the war poses many unique challenges to energy planners and companies. Some of those are especially acute in hydropower sector.

- **Inaccessibility:** Active conflict zones and stringent staff safety requirements of the MDBs prevent physical monitoring and technical assessments of key structures, which reconstruction is being financed. Financiers have very little data to ascertain that funds they provided have been used properly and efficiently and contributed to meaningful results. In case of hydropower it may be further complicated by repeated financing of repairs at the same HPPs by different financier, making monitoring of expenditures highly problematic.

- **Planning challenges:** Repeated missile strikes necessitate "repair-on-the-go," making long-term asset management difficult. New attacks destroy results of investment again and again. Each new major assault on given hydropower facility necessitates revision of any previous "rehabilitation plan". Given the repeated strikes on highly exposed powerhouses and transformer facilities at the HPPs, it is unclear measures are being taken to ensure that newly repaired equipment is not destroyed again?



Massive release of water from Dnipro HPP (Sentinel satellite image 26 April 2023)

- **Lack of explicit analysis of alternatives:** Four years of lasting war call for careful selection of investment targets, which could be protected from destruction by Russian army. In energy sector, there is a growing understanding that only distributed generation may be a guarantee against massive total blackouts (see International Energy Agency 2025). Therefore it is important to assess whether repeated rehabilitation of large hydropower facilities well-exposed to bombardment is the most efficient investment in war-time energy resilience compared to other possible alternative measures. CSOs in their unanswered letter in November 2025 asked the WB project officials whether it would have been possible to first use the available financing to install the batteries (BESS) and make it available to the energy system (a process that would take only a few months) and only then (possibly after the end of hostilities) proceed with the extensive repairs of the old hydro facilities.

Conclusion

The international financing landscape for Ukraine's hydropower is currently limited to the rehabilitation of existing assets rather than "greenfield" expansion. These initiatives reflect coordinated EU, EBRD, EIB, World Bank, and bilateral (e.g., Italy) support, often under EU guarantees and frameworks like the Ukraine Facility. Funding is typically structured as sovereign-guaranteed loans to Ukrhydroenergo, with grants covering technical cooperation, with total approved project financing, likely, exceeding USD 1 billion.

This list is likely exhaustive as of March 2026. No other major post-2023 international hydropower/dam-specific projects (new builds or unrelated dams) appear in public reports up to early 2026. While the EIB, EBRD, and World Bank provide essential liquidity for energy security, the sector faces significant tension between the speed of wartime recovery and adherence to EU environmental standards and anti-corruption transparency.

However, the projects listed concern the repair of partial damage to a number of hydroelectric power stations (primarily the Dnipro plant), but not the construction of a new hydroelectric power station to replace the completely destroyed Kakhovka plant. It should be emphasised that it is this particular proposed project that is causing significant doubts and concern amongst the public and creating tension within Ukrainian society. "Experimental project" for reconstruction of KakhovkaHPP remains in planning-only stage with no committed international financing announced publicly. Our search yielded no new formal proposals for international funding of new dam construction, Kakhovka HPP reconstruction, or unrelated hydro projects under the Ukraine Facility or other donors post-January 2023. Monitoring the MDBs portfolios, as well as US URIF and Italian-backed projects will be critical for identifying the first moves toward financing of potential Kakhovka HPP reconstruction.

The destruction of the Kakhovka Hydroelectric Power Plant has created a unique situation where decisions regarding infrastructure restoration will directly determine the long-term ecological and economic stability of the entire Lower Dnipro region. Unlike typical post-war reconstruction projects, this case is not merely about restoring lost generating capacities, but about choosing between two fundamentally different models of territorial management.

On the one hand, there is the scenario of rebuilding the Kakhovka reservoir and its associated hydropower and irrigation infrastructure (the scenario of restoring the former model, or the "status quo" scenario). On the other hand, an alternative scenario is emerging, based on preserving the natural recovery processes of the floodplain ecosystem, which have already begun across an area of over 2,000 km^2. If this scenario is chosen, Ukraine will objectively possess the largest natural ecosystem restoration project in Europe and will facilitate the creation of new climate-resilient forests (which would serve as an excellent demonstration of achieving the goals of the European Nature Restoration Law and planetary climate change mitigation targets). These scenarios are mutually exclusive, and supporting one automatically implies the rejection of the other.

In this context, the role of international financial institutions is decisive. Their financing decisions will be the key factor determining the region's development trajectory. Investments in the restoration of hydraulic infrastructure, particularly the rebuilding of the Kakhovka HPP or the creation of new reservoirs, will effectively mean financing the elimination of ecosystems that are already recovering, as well as recreating a management model that is increasingly recognized as outdated in Europe.

At the same time, financing alternative solutions — such as developing decentralized water

supply systems, modernizing the energy grid without creating new reservoirs, implementing energy storage systems, and adapting agriculture to new conditions — allows for achieving the same functional goals without generating significant environmental and social risks.

For financial institutions, this issue is directly linked to risk management policies and the principles of sustainable finance. Large-scale hydropower restoration projects on the Dnipro River are associated with a number of systemic risks:

- **Environmental risks:** the destruction of recovering natural ecosystems, disruption of habitats included in the Emerald Network, and potential violations of Ukraine's international environmental obligations. Recreation of highly inefficient unnatural water-body prone to extensive water-loss, algal blooms and spread of invasive species.

- **Regulatory risks:** non-compliance with EU approaches to water resource management, including the Water Framework Directive and river restoration policies. Deviation from EU's agricultural policies favouring efficient development of modern environmentally-friendly rural development, rather than giant fields of monocultures based on inefficient irrigation systems maladapted to climate.

- **Reputational risks:** financing projects that contradict modern approaches to sustainable development and could be perceived as supporting environmentally harmful solutions and incurring significant harm on cultural heritage of national importance.

- **Financial risks:** high construction costs and long payback periods relative to a minor contribution to the overall energy balance.

- **Security risks:** the vulnerability of large hydraulic structures as potential targets during wartime and post-conflict periods. Decentralized solutions are much more reliable and lately this has been fully recognized by Ukrai-

Kakhovka reservoir bottom in 2024 by Vincent Mundy

nian Government. According to the report from the Minister of Energy the total increase in distributed generation in 2025 amounted to 642.77 MW, while 508 MW have been added to energy storage facilities. Thus, just in 2025 capacity and storage added to the grid both exceed those of planned new Kakhovka HPP.

Furthermore, it should be noted that the energy contribution of hydropower in Ukraine is limited to 8%, whereas its environmental and social consequences are significant and long-lasting. In this context, investments in large-scale hydro-engineering projects may fail to meet the principle of proportionality between costs, benefits, and risks.

Conversely, supporting the natural recovery scenario for the Lower Dnipro creates opportunities to implement projects that align with the current priorities of international financial institutions, including:

- Ecosystem and biodiversity restoration;
- Climate adaptation and enhancing landscape resilience;
- The development of Nature-based Solutions (NbS);
- The establishment of long-term sustainable water management models.

Thus, the financing decision in the Lower Dnipro basin extends far beyond a single infrastructure project and acquires strategic significance. It will determine not only the nature of a specific region's recovery but also the alignment of this process with modern international approaches to sustainable development, climate policy, and natural resource management.

In this context, it is particularly crucial that any investment decisions be based on a comprehensive assessment of alternatives, take into account the long-term environmental and social consequences, and adhere to the "do no significant harm" principle, which also necessitates strategic environmental assessment of Lower Dnipro "green recovery" plans. Without such an approach, there is a high risk of replicating the infrastructure solutions of the past, which have already proven their environmental and economic inefficiency.